Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL, AND OTHER IMPROVEMENTS

VOLUME XII. NEW-YORK, FEBRUARY 7, 1857. NUMBER 22.

THE
Scientific American,
PUBLISHED WEEKLY
At 128 Fulton street, N. Y. (Sun Buildings.)
BY MUNN & CO.
O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns in the United States.

Sampson Low, Son & Co., the American Booksellers, 47 Ludgate Hill, London, Eng., are the English Agents to receive subscriptions for the Scientific American.

Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn, and Jersey City.

TERMS—$2 a-year,—**$1** in advance and the remainder in six months.

☞ See Prospectus on last page. No Traveling Agents employed.

Climates of the United States.

On the evening of the 29th ult., Professor Lorin Blodget, of Washington, delivered a lecture before the American Geographical Society, in this city, on the above subject. He remarked that at Fort Laramie, which is 4,500 feet above the level of the sea, the mean temperature is the same as at New York city, or at the level of the sea in the same latitudes; at Salt Lake, also, and on the plains of the Upper Missouri, no essential reduction exists. The whole interior plateau declines in altitude northward from the northof New Mexic o so much that the measure of heat is fully as great at the upper portion of this plain on the Saskatchawan, as at Fort Massachusetts in New Mexico, its highest point at the South. From this important fact it results that the northern districts are more cultivatable than the southern, and more practicable for routes of transit to the Pacific. On the coast of the Northwest we have the peculiar climate of the British Islands reproduced; and though the area is less than similar climates have in Europe, it establishes the seats of commercial activity at these high latitudes. There is a peculiar climate on the coast of California —a singularly cold summer, due to a cold sea current from the Northwest. Next come the soft vine climates of the south of Europe and of the Mediterranean. Next to this district is a reproduction of the Desert Belt of the Old World. In each of these classes of climates the quantity of rain, as well as the measure of heat, follows the same general analogy with the climates of the Old World. On the north, and over the northern plains, it is equally distributed among the seasons and moderate in quantity; on the northwest coast, excessive; on the west coast, small in quantity, as in France and Spain; meager in the Desert Belt; and, lastly, falling in almost tropical profusion in the semi-tropical climates bordering the Gulf of Mexico. In this last case the correspondence is with China and the north of India; but we have a large district having the tropical affinities which really extend over most of the area of the Mississippi Valley.

Effect of Pumpkin Seed on Cattle.

A correspondent—J. B. Freeman—of the *New-England Farmer* describes the evil effects of pumpkin seed, in rendering milch cows dry. He says he had been led to believe that they were good for feeding milch cows, and commenced to feed them out to a cow at the rate of half a bushel per day. "At that time," he says, "she was giving about eight quarts of milk per day, but instead of this increasing the quantity, it diminished it. I increased the feed to a bushel per day; still there was a decrease in the quantity of milk until the pumpkins froze up, when she did not give but four quarts per day. The cow did not fatten, and the reason for the decrease in the quantity of milk, I could in no way account for. I then took out all the seeds, when, lo, the change!—instead of five quarts of milk per day, I got nearly nine in a short time."

IMPROVED FIRE HOOK.

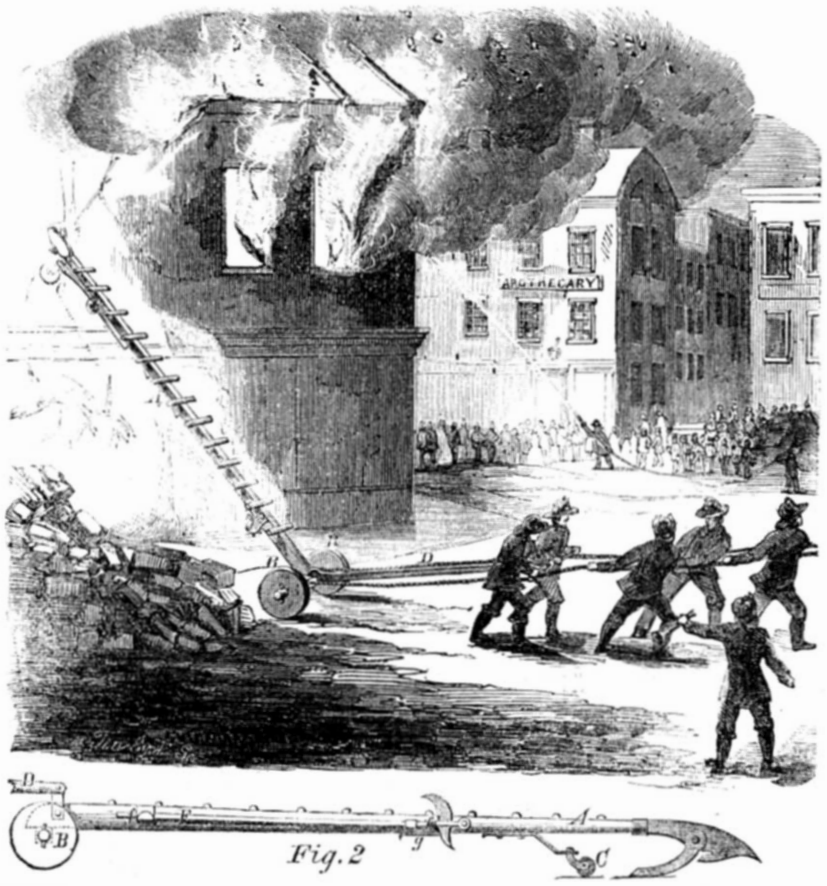


Fig. 2

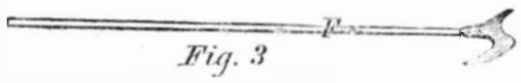


Fig. 3

The accompanying figures illustrate the construction and employment of the improved fire hook, for which a patent was issued to John G. Ernst, of Harrisburgh, Pa., on the 6th of last month (Jan. 1857.) The object of a fire hook is to pull down structures that are in danger of falling on account of having their supports burned; also to pull down walls, to confine and arrest the progress of a conflagration. By the common fire hooks, this is oftentimes a very dangerous operation. This improved hook, while it removes much of the danger attending such operations, is also far superior in its adaptations to effect the objects for which such implements are designed.

Fig. 1 shows how the improved hook is applied; fig. 2 is a side view of the hook, and fig. 3 is a side view of a small hook fastened to the side of the large one.

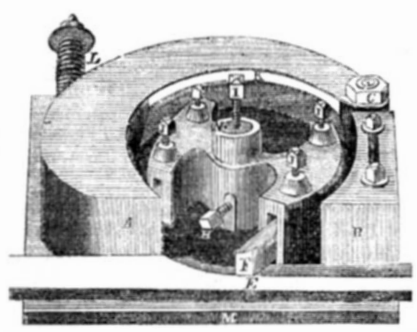
A, is a beam of wood, of taper form. It has rounds secured on it at proper distances apart; these enable a person to ascend it, like a ladder, when it is elevated. The thick end of this beam is supported by two wheels, B B—its end resting upon their axle. The opposite end of this beam, when it is down on the ground, is supported by a swivel wheel, C. A pole, D, is attached to the end of this beam at the axle, and to it a rope is attached for the purpose of moving or drawing it from place to place. A hook secured to the small end of beam, A, is formed of two parts, or two hooks, one firmly secured to the end of the beam, and the other below it, attached by a pivot. The lower hook is allowed to swing freely on its pivot inwards, but is prevented from swinging outwards by the projection on the forward end of the hook. F is the small hook (fig. 3) secured in fig. 2 by loops, f f, fitted to one side of the beam, A.

This fire hook is used as follows: When the beam, A, is to be raised, the hatchet of hook F is placed against the projection I, on the underside of beam, H, and elevated, raising the beam with its hook up to the desired point of the wall to be torn down. The hook on the end of the beam, A, is then forced through the wall, when its hinged hook takes firm hold on the inside of the wall. The firemen then drag on the rope, as represented, and, free from danger, soon pull down the wall.

This is quite a novel and useful improvement in fire hooks. This hook, having its beam, A, made with rounds, and being capable of catching hold of a brace, cornice, or of being forced into a wall, can also be effectually employed as a fire escape in many cases, to extricate persons from the upper stories of burning buildings.

More information respecting it may be obtained by letter, addressed to the patentee at Harrisburg, Pa.

Tongueing and Grooving Machinery.



The annexed figure is a perspective view of an improvement in edge cutters for tongueing and grooving machinery, to match boards, &c., in a superior manner, and more rapidly, it is alleged, than by the common tongueing and grooving machines.

The cutters are provided with a mouth-piece, A, which, by the action of the spring, L, presses against the edge of the board, E, thereby holding the fiber from splitting or tearing, while the cutters, F, act upon the board. The mouth-piece having its center of motion at C, always keeps its inner edge practically the same distance from the path of the cutter, thereby holding the fiber perfectly firm under all circumstances, whether the cutters be reducing much or little. B is a guide to steady the material as it passes out of the machine. H is a set-screw to hold the cutter head upon the spindle. I is a set screw to raise or lower the cutter head. N is an oil hole to oil the bearing; M is the bed plate; K is an aperture for the shavings to pass out; J J J J are set screws to hold the cutters in the head. This improvement is applied to the surface cutters, and can be applied to the common Woodworth machines. The mouthpiece, A, serves to hold the fiber of the timber while operated upon by the cutter, thereby preventing the tearing and splitting of the wood, although it may be cross-grained and knotty.

A patent has been issued for this improvement to James A. Woodbury, from whom more information may be obtained by letter addressed to him at No. 1 Schollay's Buildings, Court street, Boston.

Cambridge Water Works.

The Cambridge (Mass.) *Chronicle* contains a description of the new engines for the Water Works, of that city. The water is to be pumped up from Fresh Pond by two trunk engines, working pumps by direct action. Each of these two trunk engines combines the use of high and low pressure steam, and is thus described: The high pressure cylinder is placed within the other, and instead of allowing the exhausted steam to escape, it is carried back through passages in the covering of the outer cylinder, and made to enter this outer or "low pressure" cylinder at the same end as it enters the first. Here it acts expansively, and is finally conveyed through the side supports of the engine, into the condenser. The piston of the outer cylinder is a ring, and its power is transmited by three piston rods, instead of one, which are bolted to the same "cross-head," or yoke of iron, as the single piston-rod of the inner cylinder; thus the powers of the two cylinders are combined to effect the same object at the same moment. The inner cylinder is kept warm by the steam in the outer one, and this again by a small quantity of steam, which is admitted for that purpose into its hollow cover or "jacket." The diameter of the small cylinder is twelve inches, and that of the larger twenty-four inches, its piston being a ring five inches wide. The plunger of each pump displaces about sixteen and a half gallons of water each stroke. These water-pumping engines are simple and compact.

The Origin of Wheat.

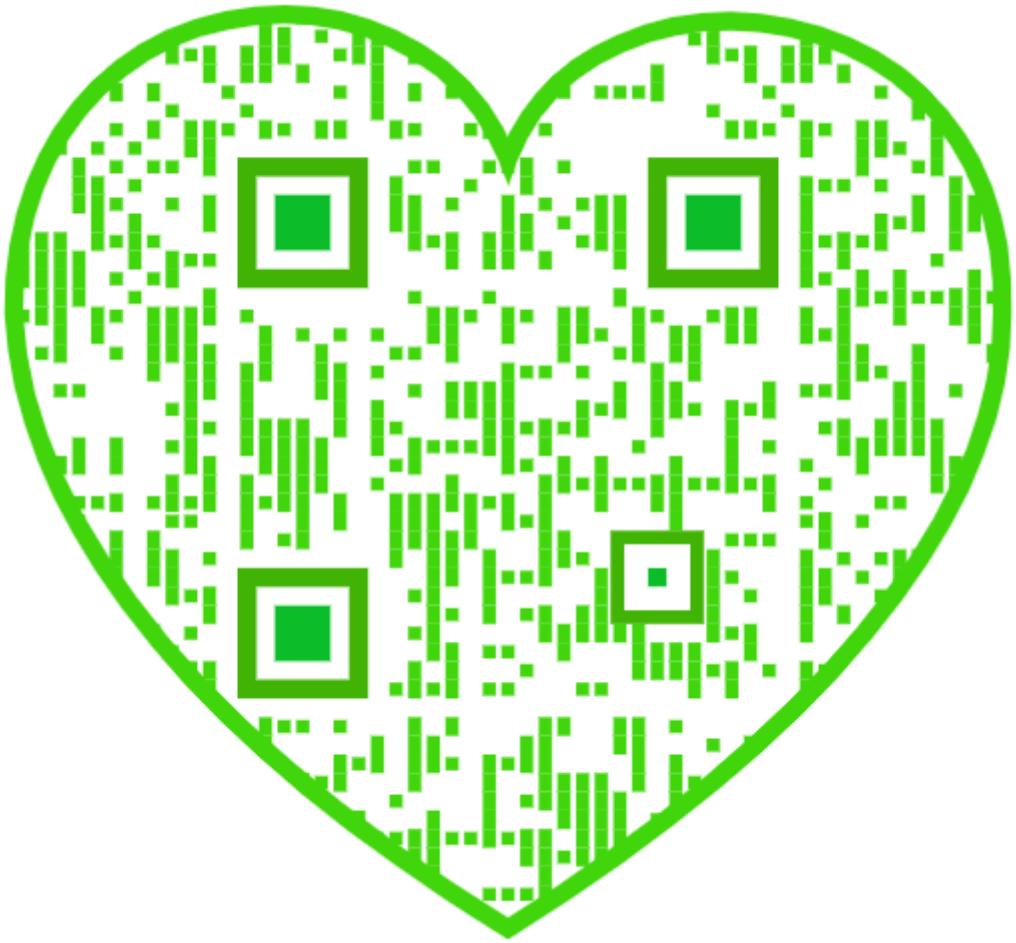
The origin of the wheat which we now cultivate, is involved in considerable obscurity. Nowhere is it found to exist native. In a paper in the *Edinburgh Review*, the author of it takes the ground that all our common cereals have been developed, by cultivation, from grains having, in their natural state, scarcely any resemblance to those now cultivated, and he asserts that the particular plant from which wheat has originated, is a grass growing wild on the shores of the Mediterranean, and known to botanists by the name of *ægilops*. If this is true, it will afford some clue to solve the question, "does wheat ever become cheat."

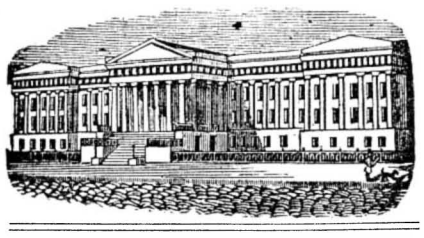
Turpentine and Resin.

The Wilmington (N. C.) *Herald* states that the exports of turpentine from that place, in 1856, contrasted with those of 1855, fall short 2431 bbls.; crude turpentine, 5175 bbls.; rosin, 2,932 bbls.; pitch, 425 bbls.

The largest gas holder in the world is in Philadelphia. It is 160 feet in diameter and weighs 25,000 pounds, and will contain 1,800,000 cubic feet of gas.

© 1857 SCIENTIFIC AMERICAN, INC.





[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JANUARY 27, 1857.

STEAM AND PRESSURE GAUGES—John Allcroft and Thomas Mighten, of New York, N. Y.: We do not claim the combination of two or more springs for any purpose when the springs are laid close together in the form of what are known as leaves.

But we claim the arrangement in pressure gauges, of two or more corrugated elastic metal disks, c d, at a distance apart, with an interposed ring or rings, g, between their edges, and one or more central bearings, i, between their centers, substantially as and for the purpose set forth.

This improvement embraces a peculiar arrangement of two or more elastic metal disks, which are acted upon by the pressure of the seam and give motion to an index. The invention overcomes certain well grounded objections to the single elastic disk gauge. Two disks have before been combined in various ways to supersede the single one, but not with success. The two disks in this gauge have an interposed central bearing, and by their arrangement the pressure of the strain upon one assists in supporting and sustaining the other disk, while they are kept from pressing against one another by a ring, This is a useful and valuable improvement.

RADIATORS FOR FIRE PLACE GRATES AND FRANKLIN STOVES—Wm. Bennett, of New York, N. Y.: I do not claim the perforated plate described in the patent issued to S. S. Savage, Oct. 28, 1856.

Neither do I claim the use of wire gauze and perforated metal dampers in any form located in the flues of stoves or throats of chimnies, nor the gas apparatus of A. Bruce.

But I claim a perforated metallic plate or radiator, filling the fire place with a flange of indefinite depth, and resting upon the fuel directly, or upon the top bar of the grate, and against the fire back, in such manner that the whole shall come below the flue of the stove, or throat of the chimney, in which it is used, leaving the passage for the cold air to the chimney flue, free and unobstructed, constructed and arranged substantially as and for the purposes set forth.

STONE GROOVING MACHINES—Geo. W. Bishup, of Brooklyn, N. Y.: I am aware that revolving hammers or cams have been made use of in stone-dressing machines for operating the chisels, and I therefore do not claim such revolving hammers.

But I claim a series of vertical inclined chisels of different length placed one behind the other, in combination with a revolving hammer or cam as described, whereby I am enabled to give a positive motion to all the chisels from a single hammer for each series of chisels, substantially as set forth.

SHEARING SHEEP—R. P. Bradley, of Cuyahoga Falls, O.: I claim increasing the length of the zigzags of the slot, e, in the lever E, as they recede from its fulcrum, so as to give the opposite end of the lever which carries the teeth or blades, d, a uniform and equal motion, as the pin is traversed in the slot, substantially as described.

This sheep-shearing machine has a reciprocating set of cutters, which cut the wool over fingers, never cutting the animal, as is done often in hand shearing. The fingers are connected with a universal joint; the operator has the machine strapped on his left shoulder, and guides it with one hand over the body of the animal, while with the right hand he drives the reciprocity cutters with a handle, and shears the fleece from the sheep with accuracy and rapidity.

TRIMMING HEDGES—Saml Bradbury, of Griggsville, Ill.: I claim the arrangement of the adjustable cutters, M, and vertical cutters, B B, operated in the manner and for the purposes set forth.

SPEEDERS—James S. Brown, of Pawtucket, Mass.: I claim the device for dropping the spindle, arranged and operated substantially as described for the purpose of enabling the operator to remove the full bobbins, and insert the empty ones in their place.

SASH FASTENER—John Broughton, of Chicago, Ill.: I claim the employment of a spring, E, on the inner surface of the curtain, h, of the socket, H, in the manner and for the purpose set forth.

This is an improvement on the sash fastener, which is applied just above and about midway of the lower sash. The bolt of ths fastener is secured on the lower sash, but pinches on an elastic socket in the upper sash. The two sashes are thus kept firmly pressed together; they do not rattle, and the bolt is always retained in place. This improvement combines several advantages.

INSERTING BUCKETS IN WATER WHEELS—Tenison Chesher, of Middleburg, O.: I claim the sliding buckets, C, when constructed and arranged as described and combined with the mortiss, e, and f, in the manner and for the purpose specified.

CORPSE PRESERVERS—Saml. Cobb, of Cincinnati, O.: I claim providing the lid of the coffin with sides or edges, D D, when arranged with the pipes, 13, at each corner of the lid, and made to extend down into the pipes, 12, in each corner of the coffin, all for the purpose of confining the ice to the top of the lid and drawing the water therefrom, collected by the melting of the ice for the purposes mentioned.

CALASH CARRIAGE TOPS—Geo. Cook and David Cook, of New Haven, Conn.: We claim the combination of the independent joints with the method of inserting the flat part of the shank or slat iron, into the slot in the bow, and securing it there, so that the leather may be stitched, and the bows and shanks afterward inserted and secured, when the whole is constructed and combined, substantially as described.

ROTARY BRICK MACHINES—Geo. Crangle, of Philadelphia, Pa.: I do not claim the use of a roller for pressing the clay into the molds of a rotary mold cylinder, nor do I claim any particular form or construction of the pressing surfaces of the roller, B, nor do I claim a pressing cylinder with recesses, and moving platens, for receiving the clay from the surface of the respective partitions of the opposite mold cylinder: and forming it into bricks by the pressure of the said surfaces, as in Zach. M. Paul's machine, patented Oct. 3, 1854.

I claim the pressing roller or small cylinder, B, having the recesses, h h, fitted with the coupled moving pistons or slides, k k, so that as the surplus clay on the face of the partition which is next above the mold, then forming a brick, is pressed into the recess of the roller, B, by the said partition, the opposite piston shall thereby be caused to discharge the previously taken up clay which is in the recess at the opposite side of the pressing roller, B, being constructed and operating in combination with the mold cylinder, A, in the manner and for the purpose set forth.

GRAIN SEPERATORS—Michael DeCamp, of South Bend, Ind.: I claim, first, the combination of the flue, 22, with the flues 23 and 24, and chamber 25, constructed and arranged as herein described for the purpose of separating light grain, wheat, &c. from still lighter substances by dividing the current of air in the manner described.

Secondly, I do not claim two fans upon the same shaft separated from each other by a fixed partition: but I claim the construction of the fan, by combining with a disk attached to a rotating shaft, leaves, fixed upon each side of the disk as specified.

HULLING RICE—Lewis F. Currier, of Portland, Me. I do not claim the use of a wheel and trough, either for pressing or mixing substances, as this is a common application of such devices in the manufacture of powder and in crushing ores, as well as pulverizing or mixing various materials, and although I believe I am the first person who used wheels and a trough for the process of skinning and pearling rice, I presume I cannot claim the same so far as a new use of them alone is concerned,

I claim the improvement in the construction and application of the wheel, or wheels, to the endless trough made substantially as described, whereby advantages in skinning rice are gained, as specified, such improvement consisting in the disked wheels, applied or arranged in such a trough essentially as set forth.

SOLDERING SPECTACLES—Geo. N. Cummings, of Hartford, Conn.: I claim the use of the supporting strips, b c, springs d, and brick e, arranged and operating in the manner and for the purpose set forth.

TAILOR'S MEASURES—Lyman Derby, of New York, N. Y.: I claim the arangement of the graduated rules for giving the outlines of the back and front of a coat when said back and front rules are suspended upon tbe jointed rule, AA', substantially in the manner and for the purposes specified,

BLASTING ROCKS UNDER WATER—James B. Eads, of St. Louis, Mo.: I am aware that weights and braces have been essayed as auxiliaries in blasting rocks on land; these I do not claim, nor do I claim blasting on land or dry blasting at all.

I claim, in combination with the column of water over the rock or other material to be blasted, a mortar or weight of greater specific gravity than the water, to act as an auxiliary in holding the blast to the rock as set forth.

BEE HIVES—Josiah D. Egleston, of Canaan, Conn.: I claim the platta, l, and wire springs m, in combination with the feed box, j, as described.

FASTENINGS FOR HAMES—Henry A. Fowler, of East Guilford, N. Y.: I disclaim the metal case and slide; also, the manner of attaching the fastener to the loops in the hames.

I claim the cam, f, so arranged and operated with the shaft, e, and cap, c, by means of a coil spring that the cap c, will always adjust itself essentially in the manner and for the purpose set forth.

FALLOWING LAND—Richard J. Gatling, of Indianapolis, Ind.: I claim a series of spades having a combined vertical reciprocation and spiral twist, through the agency of a system of cams and levers arranged and operated substantially as specified.

REPEATING FIRE ARMS—Heinrich Genhart, of Liege, Belgium: I do not wish to be understood as limiting my my claim of invention to the special construction and form specified, as these may be varied within the principle of my invention.

I claim the combination of the rotating breech with radial chambers for containing a series of charges, substantially as described, in combination with the sliding barrel, the rear end of which is fitted to enter the forward end of each chamber when brought in line, substantially as and for the purposes specified.

VACCINATING INSTRUMENT—James W. W. Gordon, of Catonsville, Md.: I claim the application of the cup shaped perforator rod, D, to the ordinary spring lancet in the manner and for the purposes set forth.

SPRING LANCET—James W. W. Gordon, of Catonsville, Md.: I claim providing the ordinary spring lancet with a sliding shield, a a, having a movement from side to side, in the manner and for the purposes set forth.

ILLUMINATING GAS—Robert Grant, of Brooklyn, N.Y.; I claim passing the products of the destructive distillation of coal and other substances, yielding carburetted hydrogen (gas), through fused metals, fusible at a low temperature in the manner and for the purpose substantially as described.

CUTTING SHEET METAL—Saml. Hall, of New York, N. Y.: I claim making the scores, c c, and b b, in the stock of the shears for the edges of the sheet metal cut to pass into, within or below the line or plane of the face of each shear blade or cutter, and increasing them (the scores) in depth, as they extend from the cutters, substantially as described for the purposes set forth.

ARTIFICIAL TEETH—Geo. E. Hayes, of Buffalo, N. Y.: I do not claim the continuous gum body, nor do I claim the mounting of teetn on a wire frame when that is used otherwise than described; neither do I claim the soldering of a wire from one pivot to another when such pivots are arranged along the alveolar ridge, as that was done by Delabarre.

I claim providing the teeth severally with a groove, b, in the base for the purpose of receiving a wire frame, C, or its equivalent with a wire or wires, A A, projecting from the base on each side of the said groove for the purpose of serving as connections with the plate, and with the wire frame substantially as specified, thereby enabling the natural crown to be represented on both sides of the tooth, and dispensing with the ordinary backing.

And I also claim the attachment of the teeth to a wire frame, c, when the said frame is employed in addition to a direct connection with the plate, and stayed to the plate by stays, f f, substantially as described to give additional stability and security to the teeth.

This invention relates to a certain method of applying the platina connections by which the artificial teeth are applied to the plate, and retained in place; all the parts of the teeth and gums are represented of the natural shape and proportions, and also affording the teeth greater powers of resistance for mastication, &c.

MAKING COILED SPRINGS—James Harrison, Jr., of New York, N. Y. I claim, first, the combination of a revolving mandrel, D, and two or more grooved rollers, arranged and operating together in any manner substantially as described for the purpose set forth.

Second, The employment of an adjustable springing bed, E, to support the roller carriage, F, or otherwise in an equivalent manner applying springs under or at the back of the roller carriage, for the purpose of enabling the rollers to accommodate their movements exactly to the longitudinal profile and varying diameter of the mandrel, and thus ensuring their proper operation.

In this machine rollers are operated in connection with a single cone mandril to produce double conical coiled springs by a continuous operation. As many springs as can be manufactured from a piece of wire of a certain length are formed by and delivered from the machine without stopping it. By this improvement these springs are produced rapidly, cheap, and of a superior quality.

HARVESTERS—Moses G. Hubbard, of Penn Yan, N. Y.: I claim the mode described of attaching the finger bar to the frame by means of two flat springs, when the same are so constructed and arranged as to operate in relation to each other, substantially as and for the purposes set forth.

ACOUSTIC AURICLE—Edwd. G. Hyde, of Irvington, N. J.: I claim the vibrating diaphragm or artificial ear, C, applied to an acoustic instrument or ear trumpet, substantially in the manner and for the purpose set forth.

A vibrating diaphragm or artificial ear is fitted to the tube of an ear trumpet, at a suitable distance from the mouth, thereby enabling deaf persons to hear distant sounds with far greater distinctness. On page 67, this volume, SCI AM., there is an illustration of Mr. Hyde's artificial ears.

FENCE POSTS—Frank G. Johnson, of Brooklyn, N. Y.; I do not claim the employment of the mixture of lime, gravel, and cobble stones in making posts, nor the mold or case in which to form the posts.

I claim the post, B, formed and constructed as described in combination with the keys, C, and rails, a a, as described.

FOUNTAIN PENS—Jos. C. Silvy (assignor to Thos. J. Dobyns,) of New Orleans, La.: I claim as my improvement upon the ink pencil described in the patent of E. Jordan, of 20th Nov., 1849; The employment of a separate or independent spring to the guide or stopper rod, for operation with it, and the pointed fountain case or handle, as shown and described, and for the purposes specified.

SEEDING MACHINES—E. D. Wooding, of Dixon, Ill.; I claim the spreading roller, H, when constructed to revolve, for the purposes substantially as set forth.

NUT MACHINES—S. H. Whitaker, of Cincinnati, Ohio: I claim the circular shears, E E, and rollers or dies, F G, for cutting off the blanks and smoothing their edges, the bar, S, being grasped or held by the mandrel, I, and bar, Q, or any proper device.

I also claim the circular shears, E E, and rollers or dies, F G, in combination with the fixed mandrel, I, punch, or rod, a', and reciprocating bar, Q, the above parts being arranged and operating as shown, for the purpose set forth.

[This nut machine has circular shears and dies having a reciprocating and rotating motion in connection with a fixed mandrel, punch, and reciprocating pressure bar. The nuts made by it are perfectly uniform and smooth, and made with much greater facility than by the usual nut machines with stationary dies.]

TEMPERING OLEAGINOUS SEEDS—Wm. Wilber, of New Orleans, La. Patented in England June 12, 1856: I claim the arrangement of machinery, by which oleaginous seeds, as they are being tempered, shall be subjected to the direct action of steam, in their transmission through the machine, from the grinding to where it is taken preparatory to its being pressed, as described.

HULLING AND SEPARATING COTTON SEED—William Wilber, of New York, N. Y: I claim, first, in combination with the runner and concave, a blast across the top of said runner, to carry the material to the spout or trunk, as soon as it rises to the top of the runner, as set forth.

I also claim, in combination with the runner and concave, the trunk, W, with its teeth, or grooves, for facilitating the separation of the hulls and kernels, as set forth.

I also claim hanging the sieve box by an eccentric, to the shaft of the runner and by the plate, N, and pins, O O P, to the frame, to give said sieve box, its compound, vertical, horizontal, and end movement. as set forth.

I also claim the plates, e f, with their dress arranged at the feeding-in point of the machine, and forming a portion of the breast of the machine, as set forth.

MASTS IN THE DECKS OF VESSELS—Thos. J. Woodworth: of Salem, N. J.: I claim constructing the partner for the masts of vessels, as set forth.

DOOR SPRING—A. F. Chatman, (assignor to himself and Jacob Pecare,) of New York City: I do not claim helical springs; nor a helix wound around a wire; nor a helix alone.

But I claim a wire, B B', doubled lengthwise on itself two or more times, in the manner described, so that it will form a spring, by opposite forces, when enclosed in a cylinder or tube, and not otherwise, to be used as a hinge, in combination with the spring, or without the hinge.

PLANING HOOPS—Sylvester Sawyer, of Fitchburg, Mass., assignor to the American Hoop Machine Co.: I claim giving the frame, N, which carries the roll, L, a play between the adjusting screws, m and n, and bringing the roll up to its work, by the spring, P, in the manner and for the purpose set forth

Second, I claim the eccentric, R, lever, S', graduated arc, T, and spring, Q, operating in the manner described, for the purpose of regulating the thickness of the hoop, and of forming the lap, as set forth.

Third, I claim the combination of the cutters, b and c, arranged in the manner set forth, upon the reciprocating gate, E, in combination with the rest, H, operating in the manner substantially as set forth.

VALVE OF STEAM HAMMERS—P. L. Weimer, of Lebanon, Pa., and S. P. Francisco, of Reading, Pa., assignors to S. P. Francisco: We are aware that expanding wedges in a vibrating arm, have been used for working the vibrating arm, have been used for working the valve, and that a rod made adjustable by screws and nuts, has also been used for this purpose; these we do not claim.

We claim so arranging the crank, U, and the expanding levers, V W, on the axes or trunnions of the hammer stock, as that they can be separately adjusted thereon, but at the same time, worked with the rocking or rolling of the hammer shaft, for the purpose of regulating, at any time, the power and motion of the hammer, by or through the movement of the slide valve, as set forth.

VERMIN DESTROYER—Welcome Whitaker, (assignor to H. L. Palmer and J. A. Skelton,) of Troy, N. Y.: I claim combining with a fumigating furnace or combustion chamber, bellows, and a flexible pipe, in the manner set forth.

I limit my claim to the use of bellows and flexible pipe, and to their use in the manner set forth.

RAISING SUNKEN VESSELS—J. P. Jourda, of New York City: I claim the arrangement and combination of the floats, chains, and chain bill or stopper, and chain dividers, for the purposes specified.

COTTON GINS—Edwin Keith of Bridgewater, Mass.: First, I claim inclining the upper part of the grates for the purpose of giving an endwise motion to the roll of unginned cotton in the hopper, substantially as described.

Second, I claim the construction of a brush cylinder, with a chamber or aperture, on the end or head of the same, into which a current of air is drawn through an opening in the side of the gin, at a little distance from the axis, and being deflected by the form and direction of the aperture or chamber, as shown by the dotted arrows, e e, is finally discharged at the periphery of the brush, near the sides of the gin; thereby preventing any accumulation of cotton at the ends of the brush.

I also claim the peculiar construction of the brush cylinder head, whereby two separate currents of external air are received at the end of the open brush, one of which currents, c c, being received near the center in a direction parallel with the axis, is allowed to diffuse itself throughout the interior of the brush, and thus augment its general centrifugal action, while the other current, e e, being diverted, and finally discharged through openings, more or less contracted, near the ends of the brush, and at right angles with the axis, tends to prevent all accumulation of cotton at the ends of the brush. The entire brush cylinder head being constructed substantially as set forth and described.

Third, I claim setting the rows of bristles in the brush, alternately at different angles with the radii of the brush, for the purpose and substantially in the manner described.

Fourth, I claim the improved method of confining the lags or wings into the heads of the cotton gin brush by means of lips or flanges projecting from the brush head, substantially as described.

Fifth, I claim the introduction of a slight current of air into the flue of the gin, through one or more openings in the mote board or bottom of the flue, for the purpose of facilitating the dropping of the notes or dirt in front of through the mote board, substantially as described.

Sixth, I claim the adjustable screw rods, k k, in combination with the sliding mote board, D, and extending outward to the front of the gin near the ginner, substantially as set forth and described.

COMPOUND RAIL—C. T. Liernur, of Mobile, Ala.: I am aware that a great many "two-part" compound rails have been designed and brought into use, more or less resembling my improvement, but none have the merit of such great simplicity of combination and ease of manufacture, or of application and removal, nor have they the material so advantageously disposed.

I do not claim the employment of a two-part rail with unbroken top and bottom, and with the division effected principally through the middle web.

I claim the combination of a two-part compound rail for railroads, in which the head of the top rail and the lower flange of the bottom rail are each left undivided, the head of the top rail not resting on the upper part of the vertical rib, B, of the bottom rail, but supported alone by its own vertical rib, in such a manner that the upper part, A, of the vertical, B, of the bottom rail can be used as a temporary rail during track laying, so that no deterioration resulting therefrom shall preventing the well fitting of both rails, and thus also giving to the top rail a support unaffected by the variations of dimensions occurring in the process of manufacture, through the rapid wearing of the rollers and the unequal heating of the iron.

OIL CASES—Isaac Van Hagen, of New York City: I claim the double tube, B b, the loose valve, C, and ventilator thumb piece, e, constructed, arranged and combined in the manner and for the purposes set forth.

CORE BOXES—Abner Van Horn, of New York, N. Y.; I claim the use of the compartments, B B, constructed and operating as described, when arranged in connection with the lifts, C C, and flask, A, as set forth.

ALTERING FLINT LOCK FIRE ARMS TO PERCUSSION; J. N. Ward: of the U. S. A.: I claim securing the cone seat upon the lock plate, and making the contact of said seat and the barrel, substantially as set forth.

STRIPPING THE TOP FLATS OF CARDING ENGINES—Geo. Wellman, of Lowell, Mass.: First, I claim the arrangement of the segmental gear, L, with its set rim, Q, and the pinion, M, with its notched plate, P, upon the vibrating arm or rocker frame, E, substantially as described.

Second, constructing the segmental gear, L, with its set rim, Q, and the lifting and stripping cams in one piece or casting, for the purpose and substantially as described.

Third, the double mangle pin segment or rim, constructed and applied for the purpose and substantially as described.

Fourth, the combination of the pinion, M, and its notched plate, P, with the double mangle pin segment, substantially as described.

KEYED HARPS—Anthony Kuhn, of Baltimore, Md.: I claim a sounding board and suspended bridge in combination with a solid bridge arranged at a distance from or beyond the sounding board, so that the strings extend across an open space between the sounding board and solid bridge, substantially as described

Second, I claim extending the strings one half their length or more, through an open space beyond the sounding board, substantially as described, so as to make the instrument produce sounds like a harp instead of sounds similar to a piano.

Third, I claim arranging the hammers above the keyboard, and making them strike the strings towards and opposite to the sounding board, near the suspended bridge instead of near the solid bridge, substantially as described.

Fourth, I claim increasing the number of strings in an instrument having the properties of a harp, substantially as described, so as to make the flats and sharps without the pedals used in the old harp, so as to dispense with the pedals for that purpose.

LIFE BOAT—Matthias Ludlum, of Essex. N. Y.: I do not claim the construction of vessels by placing a deck on two or more floats. Neither do I claim the use of two floats, as double vessels have long been known. Nor do I claim a propelling wheel between two vessels: nor having discovered any new method of giving buoyancy to vessels; nor to have discovered any new principle or method of applying any principle, or any new method of saving the lives of passengers at sea or of protecting them from its waves, but a life boat having iron floats arranged and constructed as described, is, to the best of my knowledge and belief, an entirely new article of manufacture.

I claim the life boat described, when made and manufactured substantially as set forth.

[This life-boat is made with two parallel tubular air-tight floats combined with a car resting and secured on them, and placed at such an elevation above the water-line, as to prevent passengers being washed overboar by the waves.]

SELF-REGULATING WIND MILL—J. M. May, of Janeville, Wis.: I do not claim the separate devices for regulating the wind wheels independent of their connection with each other.

I claim the arrangement of the devices which are connected with each other, as described, for the purpose of regulating the velocity of the wind wheel, and also for the purpose of controlling the wind wheel independently of its self-regulating properties.

PRINTERS' COMPOSING STICK—W. T. Tillinghast, of Dayton, Ohio: I claim the combination of the aforesaid several devices and their application in forming the composing stick.

CLAMPING MACHINE—Elbridge Wheeler, of Marlboro'. Mass.: I claim constructing the movable jaw in two pieces, and hinging them in the center, in the manner and for the purpose substantially as set forth.

COTTON PRESSES—M. L. Parry, of Galveston, Texas: I am aware that various devices have been invented for changing the motion of revolving wheels and shafts, by means of shifting pinions. But I am not aware that a press has ever been made in which there was combined with the screw a nut of the peculiar construction, shown and operating in conjunction with a shifting pinion, as described.

I disclaim the raising and lowering of a screw by means of a nut, which is caused to revolve in different directions.

I claim the double geared nut, D, working in combination with screw, C, and operated by one or more shifting pinions, F, in the manner and for the purposes substantially as set forth.

[By a simple adjustment of pinions, the "follower" of this press may be either raised or lowered without reversing the movement of the driving shaft, and the upward movement of the follower is rendered quicker than the downward movement, thus obtaining power with the slow speed, where greater power is required, and vice versa.]

ORE GLEANER—David Pollock, of Lancaster, Pa.: I am aware that machines for washing, cleaning or crushing ore or other material, have been made with parallel hollow cylinders, either perforated or closed, provided with pins, projections, or close ledges.

I am also aware of conical hollow cylinders close and perforated, provided with projections, pins or shovels, on the inner side of cylinders.

I am also aware of cylinders or rollers working single or double, one beside the other, provided with pins, projections, segments, or close ledges on the outer circumference.

I am also aware of two or more cylinders of wove wire or perforated, working one within the other, hung and revolved by the same shaft, for screening and cleaning ore and other material.

I am also aware of cylinders composed of parallel bars or rods made permanently fixed and stationary. These I do not claim.

This machine is a washer and screener and has a double operation, that of washing and screening at the same time. The ore is thrown into the one end of the cylinder and passes out at the other in a clean state, notwithstanding the cylinder rests in a horizontal position, or any required inclination.

I claim the cylinder with adjustable bars, A, the perforated guard, D, the hollow perforated shaft, G, the perforated ledges, I; the arms, J, and litters, K, the adjustable traveling roller, N, all constructed, arranged, and operated as described, for the purpose of crushing, washing, screening, and cleaning ores or other material either wet or dry.

WRITING PEN—J. F. Reeve, of Richmond, Va.: Although I have shown a peculiar arrangement of joints, springs, and wedge, I do not confine myself to the precise form or disposal of the several parts, as the same may be considerably modified without altering the result.

I claim, first, the so jointing together of the two pieces, C and C', of rigid or non-elastic metal or other material, that the same may form a pen, the required opening and closing of the point of which may be effected by the greater or less pressure of the said point on the paper, assisted by the within described springs and wedge, or equivalent device.

Second, the regulating spring, E, as applied to the arms, c and c', in the manner and for the purpose set forth.

AXLE BOXES—A. E. Smith, of Bronxville, N. Y.: I claim making metallic pipe boxes for carriage wheel hubs with the two ends cylindrical or conical, to fit the arm of the axle, when these two sections are connected and combined with the intermediate part corrugated or fluted inside and outside, substantially as described, for the three-fold purpose of giving greater strength with a given weight of metal, to form a series of longitudinal oil cells all around the arm of the axle, and to form longitudinal ribs all around on the outside to enter the wood when driven in, that it may be effectually held and bound in the huh, substantially as set forth.

FORGING METAL—Elbridge Wheeler, of Feltonville, Mass.: I do not claim the use of rolls revolving in fixed bearings, and having dies therein, for the purpose offorging or forming specific articles,

I claim the described combination and arrangement of the rolls, C and D, one of them being capable of motion to and from the other, and entirely within the control of the operator, as set forth.

Second, I do not claim an annular guard or ring secured to one roll, and playing in a groove in the other, a this has been used before.

I claim the stationary guard, P, adapted to grooves in both the upper and under rolls, and operating in the manner and for the purpose substantially as set forth.

Third, I claim prolonging the boxes in which the rolls run for the purpose of straightening the work, as described.

© 1857 SCIENTIFIC AMERICAN, INC.

LATHE MACHINE—J. B. Okey, of Indianapolis, Ind.: I claim the arrangement of one or more series of cells, D, and their gauge stops, E, in the arcs of concentric circles for the reception of the blanks, in combination with an oscillating knife or knives, mounted and operating in the manner substantially as and for the purpose specified.

HERNIAL TRUSSES—S. S. Ritter, of Philadelphia, Pa.: I claim the combination of the springs, A and f, with the pad attachment, substantially as and for the purposes set forth.

HARROWS—D. W. Shares, of Hamden, Conn.: I do not claim the particular construction of the frame or the shape given to it as described; nor do I claim making the frame adjustable to different widths.

I claim the construction and arrangement of the series of teeth, H, on the side bars, B B', in relation to the said bars, and to each other, in the manner and for the purpose specified.

PARING AND SLICING APPLES—Clarissa A. Hubbard, executrix, of Guy H. Hubbard, deceased, late of Shelburne Falls, Mass.: I do not claim the cutting of apples into continuous slices or ribbons, nor any formation of slices, to prevent their close packing, while drying. Neither do I claim nor confine myself to any particular curvature of the knife, O, nor the application of the arm, N, and knife, O, so the particular machine represented.

I claim the arrangement of the machine with its paring and slicing knives, in such a manner as to careen upon the point, B', in the manner and for the purpose substantially as set forth.

RE-ISSUE.

PORTABLE STEAM SAWING MACHINE—S. R. Wilmot, of New York City. Patented Aug. 14, 1855; I do not claim, in the abstract, the principle of conveying steam, by means of a flexible pipe, as I am aware that flexible pipes have long since been used to convey steam and other elastic fluids.

I claim an independent portable steam sawing apparatus, constructed substantially as set forth, and connected in such a manner with the boiler for generating steam, that the steam sawing apparatus can be moved from tree to tree, or applied in different positions, at different parts of the same tree, without moving the steam boiler, or breaking the steam connection therewith.

DESIGNS.

COOK STOVES—N. S. Vedder, (assignor to Wolfe & Warren') of Troy, N. Y.

PARLOR COOK STOVES—N. S. Vedder, (assignor to Wolfe & Warren) of Troy N. Y.

R.R. CAR STOVES—J. L. Howard, of Hartford, Conn

One of the Prizes.

MESSRS. EDITORS—I see in the annual award of prizes published in No. 18 of the SCIENTIFIC AMERICAN, that I have been awarded the fourth prize of $125 for my list of subscribers—108 I believe. The amount you will please forward to me by Express, at my expense; and, for the present, accept my sincere thanks for so liberally rewarding my humble efforts to extend the circulation of your most excellent journal. I intend to appropriate a portion of the money as you suggest, and of the balance I shall endeavor to make good use, such as I think you would approve if you were acquainted with my circumstances. You will perceive by the large list sent in so late in the season, that your journal is gaining favor in this place and vicinity, and I think will (as it should) continue to do so until it shall take the place of a great portion of the large and cheap Eastern weekly publications filled with tales and romances, which are now read by thousands of young men, to the exclusion of something more solid and useful. JOHN GARST.

Dayton, Ohio, Jan. 21, 1857.

[The above is one of the several gratifying letters we have received from the successful Prize competitors. Mr. Garst intimates a determination to devote a part of the money he so justly earned, to some benevolent purpose and when in such hands as those into which this $125 has fallen, the inquiry need not be made as to what purpose he proposes to apply it: he will make judicious use of the money, the public may be assured, and the mechanics and apprentices obout him will be benefitted by his good fortune.

Bleaching Paper Rags with Gas.

MESSRS. EDITORS—In No. 17 of your valuable paper, you give Prof. Muspratt's opinion as in favor of using chlorine in the gaseous form, for bleaching. This coincides perfectly with the experience of all German and French paper-makers, who use chloride of lime in the usual way, only as a convenient auxiliary. In both Germany and France the manner of sizing the paper with "vegetable or engine size," makes it an essential point to use it among such rags as contain a good deal of natural size, and are of a strong fiber. These are called "home-made linen," mostly of hemp, and either not bleached at all, or imperfectly so. In both cases they contain, besides their coloring matter, a great many woody particles of the stem or *shieve*, and to destroy them, chlorine in the gaseous form is indispensable. The proof of this you will find in all American writing-papers. There is hardly any gas-bleaching done in this country, therefore the paper contains much of the shieve of the few linen rags that are mixed with the cotton, while the German and French writing papers, exclusively made of linen rags, contain hardly any.

Bleaching by gas, when repeated, shows a far greater difference than bleaching with chloride of lime in the usual way, which latter operation is therefore hardly ever repeated in paper mills.

The manufacture of the chlorine gas by the acids and manganese, can be carried on in every mill with very little trouble, but chloride of lime is no doubt the cheapest method. I think, however, that less trouble may yet attend the gas operations, the greatest difficulty hitherto being to get large quantities of pulp sufficiently dry to be acted upon by the gas. I have seen cumbersome and costly apparatus for this purpose in New Jersey; but with the centrifugal dryer I cannot see any difficulty, especially for the few linen rags which are used to strengthen our cotton rags. In Europe the cotton rags are of so low a quality, that they are entirely out of question, except for very common writing or middle printing paper. J. K.

Lee, Mass., January, 1857.

The Science of Satisfying the Fastidious Taste with Tea.

A well-known fact is obvious to most tea-drinkers, that if they find a tea which suits the taste, they wish to continue drinking the same kind. But how can the retailer constantly supply the same, when our dealers import so few chests of a kind each year? The dealer who understands the science of flavors, or, in other words, who knows by experience or experiments what effect one flavored tea has upon another, may, by mixing those of different odors and qualities of the same kind, produce one containing all the characteristics of the tea to be matched, with the exception, perhaps, of its appearance to the eye.

There is not a tea imported into this country which is not mixed. The writer of this has been in the tea business for the last nine years. Having studied its qualities and examined its mixtures, and has yet to find a tea that was not mixed, although presented with samples (as curiosities) which cost from five cents to sixteen dollars per pound.

The very system adopted by the Chinese necessarily obliges them to make up their various kinds by mixing; and there is not so much harm in this as there is in the dishonest system of adulterating teas with spurious leaves and other trash.

The retailer that is honest will only put together those teas which are sound; and if he is thoroughly skilled, will equal his "Celestial" brethren in the nicety of his preparations.

The consumer should always select tea that has a uniform appearance, both as regards shape and color, particularly if it be green. Put it in the damp hand, and if a coloring matter adheres, reject it; a better way is to put about as much tea as can be taken between the thumb and first finger into a white tea-cup, and fill three-quarters full of boiling water, after it has infused about one minute, stir it gently once around; if a blue or green powder or sediment adheres to the side of the cup, it is poisoned. If there are different shaped leaves—particularly if they are not serrated—and buds or seeds in the bottom of the cup, it is adulterated. Again, while stirring, place your nose close to the cup and its odor will be manifested. If you are not tasteing teas in the cup, rub the leaves in the hand, blow the breath upon them and smell; or chew a mouthfull to a mass, then smell.

A few words on the price paid for teas. It is seldom that the retailer is willing to sell good wholesome tea for less than fifty, and more frequently for seventy-five cents per pound; the mechanic generally pays a higher price for tea than professional men, its soothing qualities calms his excited nerves, and its nutrition helps to feed the muscles that strikes the mighty blows; to forge the useful and beautiful in manufacture.

AMERICAN THEA.

[Our correspondent has directed attention to a very important subject, and one respecting which the public is but little acquainted. No less than 40,244,000 tuns of tea were shipped to the United States from China during 1856.

In Toledo, Ohio, the people are sinking an artesian well which will be 2500 feet deep.

Cure for Sore Hands Caused by Chemicals.

MESSRS. EDITORS:—As a practical chemist, having adventitiously discovered a remedy and preventive for sore hands, caused by the use of potassa or cyonides in manufacturing establishments, I feel it a duty as well as pleasure to commnnicate my discovery to you, that it may be known to the operatives of our country and save them from many hours of suffering and the loss of much valuable time. The remedy consists simply of making a solution of chrystals of sulphate of iron in water, and applying it to the sore, which will be dried up in a few hours—or as a preventive, using it as a wash. The potassa in the sores unites with the iron in the solution, and is precipitated in the shape of rouge, or if a cyanide, it forms Prussian blue, either of which is noxious to the flesh and will readily wash out. Workmen whose labors require the use of either caustic potash or cyanide of potash, should use Castile or soda soap, melted or dissolved, into which should be introduced sufficient of the solution of sulphate of iron to give the whole quite a dark color. My personal experience fully demonstrates the entire efficacy of this discovery as a remedy in the case above alluded to. JAMES CURTISS.

Chicago, Ill., Jan. 1857.

The Recent Storm.

Lieut. Maury gives public notice that he will gladly rceive from any party the results of observations upon the recent storm. He adds:

"I wish very much to study the rise and progress of this storm as it marched over the country.

I do not confine this request exclusively to those who are provided with instruments, and who keep meteorolgical journals; but I make it to those also who have no meteorological instruments. Instrumental observations are to be preferred; but when none of them are to be had, then those that are made with the eye alone will be very acceptable. For convenience, I submit a *pro forma* set of questions to be answered for each day from the 14th to the 22nd instant, inclusive:

(Name of place,) Jan. 14, 1857.

1. What was the appearance of the sky? 2. The force and direction of the wind? 3. When did it change, freshen, or go down? 4. When did it commence to snow or rain? 5. When did it stop? 6. How much fell?

Let those who keep meteorological registers give, in addition to the above, extracts from their journals for each day, stating the readings of their instruments."

Light for Dark Places.

O bed Blake, glass manufacturer in London, has just obtained a patent for an invention described in the *Engineer*, as follows:—

"The nature of these improvements relates, in the first instance, to obtaining the greatest possible amount of light for places which would usually be dark, and where it is necessary in obtaining light to keep in view great strength, or resisting power, in the illuminating medium and its adjuncts, and such economy in material as will permit the illuminators constructed under this invention to be generally employed. The patentees term them grating illuminators, as they are in fact gratings filled with glass. Assuming one of these gratings to be inserted into a ship's deck, it will be found that the light which enters the slips or slip of glass fixed edgwise in the openings of the grating, will pass through with no greater diminution than would occur in a plate of polished glass of the thickness of said grating; while the narrowness of the glazed apertures combined with the depth of the glass, and the metal or other substanee of which the divisions of the grating may be made, gives strength so great, that heavy weights may be thrown upon, or be rolled or dragged across the grating without injury thereto; and further, while the brilliancy of polished glass is retained, the slipperiness of surface is avoided by means of the slightly raised edges of metal or other substance, which form the divisions between the pieces of glass."

This invention appears to be nothing more nor less than the common "vault light" so extensively employed in this city.

Yearly Food of One Man.

From the army and navy diet scales of France and England, which, of course, are based upon the recognized necessities of large numbers of men in active life, it is inferred that about two and one-fourth pounds avoirdupois of dry food, per day, are required for each individual; of this about three-fourths are vegetable, and the rest animal. At the close of an entire year the amount is upwards of 800 pounds. Enumerating under the title of water all the various drinks—coffee, tea alcohol, wine, &c.—its estimated quantity is about 1500 pounds per annum. That for the air received by breathing may be taken at 800 pounds. With these figures before us, says the *Medical World*, we are able to see how the case stands. The food, water and air which a man receives, amount, in the aggregate, to more than 3000 pounds a year; that is, to about a ton and a half, or more than twenty times his weight. This enormous quantity may well attract our attention to the expenditure of material required for supporting life. A living being is the result and representation of change on a prodigious scale.

Venilating Railroad Cars.

We learn from the *Cobourg* (Canada West) *Sun*, that Sheriff Ruttan's system of ventilating railroad cars has been presented with a flattering address by passengers who have traveled in a car ventilated according to his invention, on the Montreal and Toronto Railroad. The car was crowded, yet the ventilation was perfect, and the temperature comfortable, while the very reverse was the case in the other cars belonging to the same train. A number of American gentlemen on the train are signers of the address, and it is headed with the name of Hon. Malcom Cameron.

Phosphoresence of Insects.

The English chemist, Thornton T. Herepath, has been taking advantage af a recent trip to South America to collect and examine fireflies, in order to get at the secret of their luminosity. The commonly received opinion in regard to the source of the light emitted by insects, is that it is due to the slow combustion of phosporous, resembling that produced by gently rubbing a match with the fingers. Mr. Herepath denies this, however, as he was unable, on the application of the most delicate tests, to detect the smallest trace of phosphorous in the bodies of these curious little creatures. His opinion is that the light is caused by the burning of a peculiar compound of carbon and hydrogen, formed in a special gland.

Spikenard.

This odoriferous plant belongs to the Valerian order, and although its fragrance is generally considered unpleasant to European nostrils, it is so much admired by Eastern natives that some of the most esteemed Asiatic perfumes are composed of valerian and spikenard. The fragrance of spikenard is frequently mentioned in the Holy Volume. "While the king sitteth at his table, my spikenard sendeth forth the smell thereof." "There came a woman having an alabaster box of ointment of spikenard very precious." It is nevertheless unknown to English and French perfumers.—[Piesse's Art of Perfumery.

Resuscitation of Locomotive Works.

The Covington Locomotive Works, situated on the banks of the Ohio, opposite Cincinnati, have gone into the possession of Messrs. Wolff, Scott & Finck. They have been suspended for about two years, and they will in future flourish in the name of the Kentucky Locomotive Works. The new owners will commence building locomotives again, as the river opens to give them a supply of coal. With the additional erecting shops that are being put up, the works will class with the largest of the kind in the West.

A terrific hurricane devastated the Phillipine Islands on Oct. 27. All the suburbs of Manilla and the neighboring villages were rendered to heaps of ruins. More than ten thousand houses were destroyed within a circuit of about eight leagues around Manilla

© 1857 SCIENTIFIC AMERICAN, INC.

New Inventions.

Safety Friction Matches.

As some recent fires in this and other cities are believed to have been caused by the spontaneous combustion of friction matches placed in contact with combustible materials, a safety match is of no small importance. The Swedish friction matches of M. Lundstrom, manufactured at Jonkoping, in Sweden, are stated to be the safest kind in the world. The common matches are made with phosphorus, sulphur, and chlorate of potash, or niter—all on the match. The Swedish matches are made with the sulphur and niter only, placed on the match; the phosphorus, in an amorphous state, being mixed with the sand paper on the bottom of the match box, against which the match is rubbed to ignite it. It is only when the sulphurized match and the phosphorized sand-paper come in contact, that ignition of the match is effected. This renders these matches much safer; they will not produce casual ignition. The London *Journal of the Society of Arts* praises the invention, but although such matches are safer than the common kind, they cannot come into *general* use, because the common match contains upon itself the elements of ignition, and is thus more convenient.

French Railroad Clocks.

Time is telegraphed along the railway lines of France to each station, from the Paris Observatory. A plan has lately been adopted of having *two* minute hands on each station clock—one red and one black. The black one shows the railroad time, the red the local time, differing from a minute to half an hour. Thus, at Paris, the two hands are identical. A hundred and fifty miles east, the red hand is ten minutes in advance of the black one. A hundred and fifty miles west, the red hand is ten minutes behind the black one. By this simple plan, common mistakes and confusion are prevented. As the two hands are fixed on one shaft, it is easy to regulate both as one.

Gun Cotton in Rifles and Shot Guns.

In a letter received from Gilbert Smith, of Buttermilk Falls, Orange county, N. Y., he asks for an explanation of the fact, that a larger charge of gun cotton can be employed in a light fowling piece than in a rifle? He says:—"I had occasion a few years since to make some experiments with gun cotton, in the course of which I had a splendid cast steel rifle destroyed. The lock, stock and barrel were made a complete wreck with only twelve grains of gun cotton. The barrel weighed twelve pounds, and it had been fired hundreds of times with from 80 to 120 grains of the best rifle powder." He knows of two instances in which rifles have burst with charges of gun cotton, which could be fired without bursting a fowling piece.

The reason of this destructive action of gun powder on rifles is owing to its very quick—almost instantaneous—ignition, and the great resistance of the ball. The shot in a fowling piece is easily started; it offers less resistance to the action of the sudden expansion of the gun cotton into gas, than the rifle ball. Fine gunpowder is more safe and much better for shooting with smooth bored fire arms than with rifles, because the grooves in the rifle twists the ball round on its axis, and cause great resistance to the expansive force of the powder. Coarse powder should therefore always be used in a long barreled rifle, while a short rifle should have a heavier barrel, and finer powder should be used in it. The velocity of balls discharged by rifles is much less than those from muskets; and it appears to us that could a spinning motion, on its long axis, be given to a ball discharged from a smooth bored fire arm, they would be preferable to rifles.

The Inventor of the Stereoscope.

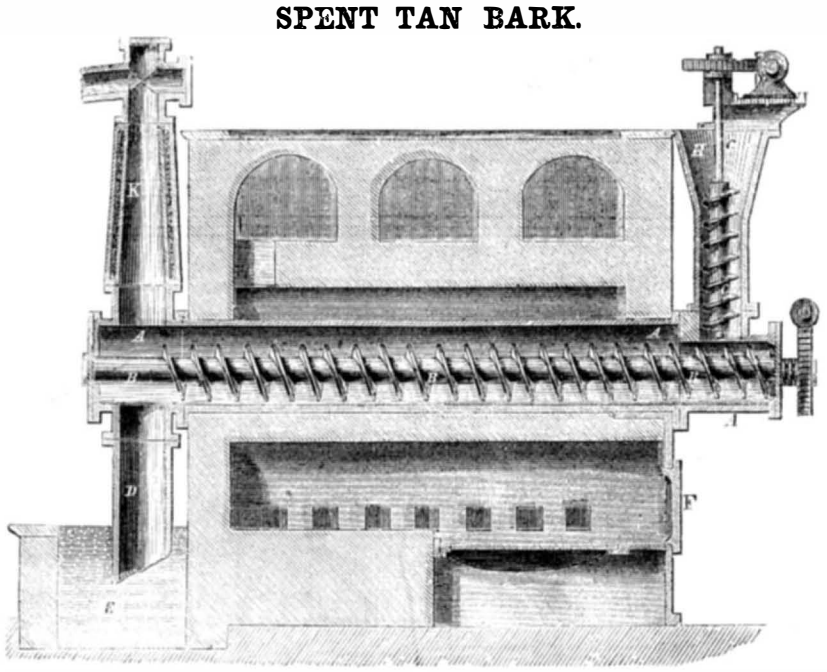
Professor Elliot, of Edinburgh, writes, in correction of the statement that appeared recently, to the effect that Sir D. Brewster attributed to him the invention of the stereoscope. He says, "To the invention of the instrument generally, I lay no claim; for, however early the period at which I may have contemplated the construction of it, the rightful claimant of every discovery is the first publisher of it, and in this case, that is Professor Wheatstone. The great improvement of the instrument, by the introduction of the lenses, giving it its present convenient and popular form, is due to Sir David Brewster himself."

Experiments with an Antidote for Snake Bites.

Experiments have recently been made before the London Society of Arts, on a new article resembling *guaco*, famed for being an antidote to the poison of the rattle-snake. But a rabbit, exposed to the bite of a puff-adder, died quickly of convulsions, although eight or nine drachms of an infusion of the root were given by Dr. Chambers to the timid little creature before being exposed in the cage.

It had been stated that the Indians of South America, by drinking an infusion of this root, were proof against poisoning by snake bites.

PYROLIGNEOUS ACID FROM SAW-DUST AND SPENT TAN BARK.



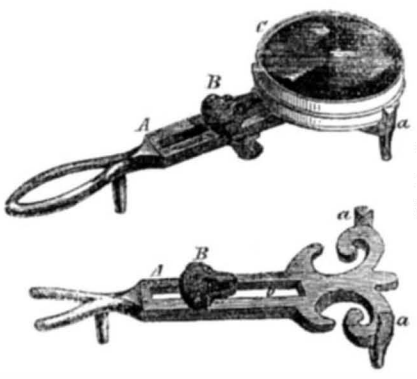
The accompanying figure is a vertical longitudinal section of an apparatus described in Prof. Muspratt's new work on chemistry as a recent invention of Messrs. Halliday, of Salford, Eng., for manufacturing pyroligneous acid from saw-dust, spent tan bark, dyewoods, &c.

For a long time the distillation of saw-dust to obtain "wood vinegar," as it is sometimes called, was unsuccessful, because a layer of charcoal made from the saw-dust, coated the inside of the retort, and adhered to it so firmly that the progress of distillation was checked by the non-conducting property of the charcoal retarding the advance of the temperature. This apparatus was designed to obviate this evil. The saw-dust, spent dyewood, etc., are introduced into a hopper, H, placed above the front end of an ordinary cylinder, A A, in which a vertical screw or worm, C, revolves, conveying the material, and in the proper quantities, to the cylinder, placed in a horizontal position, and heated by means of a furnace F. Another revolving screw or worm, B B, keeps the material introduced into the retort by C, in constant agitation, and at the same time moves it forward to the end. During its progress through the retort, the materials are completely carbonized, and all the volatile products disengaged. Two pipes branch off from the ulterior part of the retort, one, D, passing downwards and dipping into an air-tight vessel of cast-iron, or a cistern of water, E, into which the carbonized substance falls; the other ascending pipe, K, carries off the volatile products of the distillation into the condenser, consisting of pipes of copper or iron, immersed in or surrounded by water. The quantity of acid obtained from spent dyewoods, equals the amount usually derived in the ordinary distillation of wood.

After distillation, the acid is removed to large tubs or vats, and neutralized with lime. It is then allowed to stand for a few hours, and the clear solution syphoned off into evaporating pans. The vessels used for this purpose are made of wrought-iron, of an oblong shape, about nine feet in length, four feet in width, and two feet in depth; they contain about four hundred and fifty gallons. The solution is boiled down to a proper consistency, put into draining buckets, and then removed to a drying room. This is the ordinary process; but when the acetate is required of superior quality, the solution should be properly evaporated, then allowed to stand for eight or ten hours, carefully drained off from its sediment, and boiled to its crystalizing point. Simple distillation, though it separates a large portion of tarry matter, never renders the pyroligneous acid pure; this can only be effected by neutraling the acid with carbonate of soda, evaporating the solution to dryness, and then subjecting the exsiccated mass to fusion. The *black cake*, as it is termed, is redissolved, boiled to the crystalizing point, and drawn out into large shallow vessels to deposit the salt.

In various sections of our country, especially in the northern parts of this State, great quantities of wood are now baked into charcoal for making iron, by roasting it in large ovens. It might, in many cases, be distilled, thus saving the pyroligneous acid, which is now lost. At Lowell and Lawrence, Mass., and at Providence, R. I., and other places where great quantities of dyewoods are used, it might be profitable to distil the spent dyewoods in snch an apparatus as this, for the purpose of obtaining wood vinegar for manufacturing the acetate of iron, and the common red liquors which are so extensively used in calico printing and dyeing.

Blacking-Box Holder.



The accompanying figures represent a neat and convenient contrivance for securing and holding blacking-boxes. Every one who uses paste-blacking knows the inconvenience of holding the box while applying the brush to replenish it. This little clamp or holder is an article of utility, and as such, notwithstanding its simplicity, it is a useful invention. The instrument is made of cast-iron, japanned and of an ornamental appearance. It is cast with a slot, *b*, in it, for the reception of an adjustable screw bolt, B. It has three legs on its under side, and two cheeks, *a a*, on its upper surface. The blacking-box, C, is placed in the seat against the two cheeks, *a a*, and the head, B, of the screw bolt, slid against it—this head forms a clamp. The nut of this screw is on the under side, and by turning it, the box is secured firmly between the head, B, and the cheeks, *a a*. When using this instrument, the handle, A, is grasped in the left hand, and the brush applied to the blacking in the box with the right hand.

The convenience and utility of this neat blacking-box holder are apparent. They can be put up neatly, and will come into very general use.

A patent was issued for it on the 13th of last month (January, 1857) to Messrs. W. and J. Cairns, No. 40 Reade street, this city, from whom more information respecting the sale of State and individual rights may be had.

Artificial Milk.

The Paris correspondent, J. Nickles, of Silliman's Journal, describes as follows a new liquid under the above name, which has lately been introduced in Paris.

For some time a liquid has been prepared which is said to have so far the qualities of milk that it is called artificial milk or "lait-viande." It is prepared as follows. Into a Papin's digester three killograms of fresh pounded bones are put and one killogram of meat, with five or six times as much of water. The top is hermitically closed: double sides surround it, and in the cavity between, a current of steam circulates which raises the temperature of the digester up to 140° F. At the end of forty minutes after reaching this temperature, a stop-cock with a small orifice is opened which lets out a vapor having the odor of broth; but some seconds after, there issues a white liquid which is nothing but the artificial milk. After this milk has passed out, the digester contains only the meat, the boiled bones, and a soup of inferior quality. The artificial milk resembles milk in color, consistence, odor, and even taste. But in composition it is different; for it is only an emulsion produced by the fat mixed with the water by means of the gelatine. Although the name artificial milk is not proper, it has some nutritious qualities, and for this reason it is now under trial at the hospitals of Paris

Description of an Experiment with Bessemer's Process.

The editor of the Glasgow *Herald* describes as follows, in a terse and clear manner, a recent experiment made to test the Bessemer process, of which he was a witness:

"A cupola and furnace had been erected for the purpose, where about eight tons of iron were to be converted from the crude pig state into that of malleable iron. The cupola was tapped, and the melted iron admitted by a trough into the furnace, which was fitted up with air pipes, through which the compressed air was carried to the molten metal. At first the air was carried in at a pressure of eight pounds, when a shower of sparks rushed with force from the top of the furnace. This continued for the space of twenty minutes, when the pressure upon the air was increased to ten pounds. No sooner was the air so pressed admitted to the furnace than the ebulition was increased to an astonishing degree, and forthwith commenced an exceedingly grand display of pyrotechny. By and by, masses of slag and scoria were thrown up from the boiling mass of iron, while the brilliant shower of stars increased. This continued for about other fifteen minutes, when the sparks gradually diminished, and a volume of thick luminous smoke burst from the furnace, which was followed by a faintly purplish flame, showing that the process was nearly completed. The process, which occupied in all about forty minutes, being now complete, the furnace was tapped, and the purified iron was run into moulds. The specimen of iron, after being purified, showed a bright silvery whiteness, with large crystals, but exceedingly brittle. The specimens of rolled iron preserved the same crystaline appearance on fracture, but in a state of greater compression and without the slightest traces of fibre. From what we saw of the iron, it appears to want every quality which would render it valuable for such purposes as malleable iron are usually applied—in fact, the specimens we examined were not malleable, and had nothing of that tenacity or ductility which render iron valuable.

© 1857 SCIENTIFIC AMERICAN, INC.

Scientific American.

NEW YORK, FEBRUARY 31, 1857.

The Invention of Vulcanized India Rubber.

The elastic character, the water and air proof qualities possessed by india rubber in its natural state, early attracted the attention of various persons to it, as an article eminently adapted for a great variety of purposes, especially water-proof clothing. It was first made into a cement by dissolving it in naptha, or in spirits of turpentine, then applied to the surface of cloth and dried, forming a fabric impervious to water and air. Such fabrics were easily affected with heat, rendering their cement soft and clammy, and they possessed a very disagreeable odor. They were unfit to be worn as article of dress, consequently their use was very limited. What a change has come over india rubber manufactures, since the discovery of vulcanization! Such fabrics are now manufactured yearly in our country, to the value of several millions of dollars; they are applied to almost any purpose, and assume every variety of form. They have no longer an offensive odor, while they maintain their elasticity in all weathers, and can withstand the temperature of high-pressure steam without becoming soft. These results have been accomplished by two inventors, the invention of one (N. Hayward, of Woburn, Mass., dating 23rd Nov. 1838,) embracing the adding of a little sulphur to the india rubber, forming a new compound; that of the other (Charles Goodyear, in 1844,) embracing the submitting of sulphurized india rubber compounds to a degree of heat of about 270° Fah. These two inventions have been the means of originating and establishing new branches of business, and new articles of manufacture, from which, not only our own country, but every country on the face of the earth, is now deriving immense advantages. The patent of Hayward, which was assigned to Goodyear, has been public property for some years; its extension having been refused by Mr. Hodges while Commissioner of Patents. Endeavors are now making to obtain an extension of it by an Act of Congrees, and the petitioners by counsel have been heard before the Committee on Patents in the House of Representatives.

We do not know what will be the final action of Congress on this question, but it is rather remarkable, that at the present moment, strong testimony has been evolved to prove that N. Hayward is not the original inventor of the sulphurized india rubber compound; that it was invented in Germany in 1832, six years before Hayward's patent was granted. A pamphlet has been put into our possession, which is a translation by Prof. Angell, of Brown University, Providence, R. I., of a publication issued in Berlin, Prussia, in 1832, describing experiments made by F. Luedersdorff with india rubber, and the production of sulphurized india rubber compounds. The clamminess of disolved india rubber, and its tendency to decomposition are attributed to its resinous properties. On page 28, the following language occurs: "After a long series of experiments, in which neither deodorizing nor oxydizing substances, neither alkalies, nor mechanical means, which affected the speedy drying, produced the desired result; I succeeded at last in finding in sulphur the substance, which even in very small quantities, perfectly prevented the injurious effect of the resinous aggregation." Instructions are given how to prepare the sulphur solution, by heating and stirring 3 parts of flour sulphur in 100 parts of rectified oil of turpentine, bringing them to a boiling heat then dissolving the india rubber in the solution. By Hayward's patent, one tea spoonfull of sulphur was mixed with that quantity of oil of turpentine required to dissolve a pound of india rubber, and in this respect, there is little differance between his method and that of the Prussian doctor. It is the sulphur which is the grand agent in the production of vulcanized india rubber, no matter how combined, in solution, or with india rubber softened by heat. Leave sulphur out of the question, and we would have no vulcanized india rubber fabrics.

The question now arises, what reliance is there to be placed upon the authenticity of this pamphlet, published six years before Hayward's patent was obtained? We have been assured that the original work is in the College Library, at Providence R.I.; but it is rather singular, that in the many controversies on this subject, and the numerous suits at law which have taken place, respecting the originality of the invention, that such information was not produced as testimony before some tribunal.

That Dr. Leudersdorff made the experiments described, we will assume to be true in every respect, but neither is our country or any other indebted to him in the least, for the introduction and success of india rubber manufactures. To American inventors alone, is the world indebted for the invention of vulcanized india rubber. Hayward was no doubt totally ignorant of the Prussian doctor's experiments; he probably could not read German; he made the discovery of sulphurized india rubber by his own efforts, and he is an original inventor, in this sense of the term.

We are opposed, however, to the extension of his patent, by a special Act of Congress; it has become public property, and to extend it would do great injustice to the public.

Building in Frosty Weather.

The bond which unites brick to brick and stone to stone, to form a close and adhesive connection between them, is a cement (mortar) formed of the oxyd of calcium (lime,) silica or sand, and water. The water intimately diffused through mortar is the vehicle which plays the most important office —chemically speaking—in conferring those qualities upon mortar which render it capable of fulfilling the objects for which it is used. And yet most builders, architects, and those who have buildings erected during the winter season, appear to be entirely ignorant of this fact in chemical science.

The water in mortar holds lime in solution, and gradually attracts carbonic acid from the atmosphere, whereby its particles acquire powerful cohesive and adhesive properties, and in the course of time it becomes a stone itself, firmly adhering to the surfaces which it unites. If we dissolve some quicklime in water, in a vessel, and allow it to stand exposed for some hours; it will attract carbonic acid from the atmosphere, and a thin, hard scale like ice will form on its surface; this is a pelicle of marble, it is composed of lime. water, and carbonic acid. The scale formed on the surface of the lime solution in the vessel, prevents carbonic acid penetrating under it, otherwise a thick solution of lime would soon become a solid block of marble. But in common mortar the conditions for the absorbing of carbonic acid throughout all its parts, are very perfect, because the particles of sand render it sufficiently porous to allow the air, which contains carbonic acid, to penetrate to its inmost parts; therefore mortar ultimately becomes a stone. If we take quicklime and sand, mixed together in proper proportions to form good cement, but use no water to make them into mortar, exposure of them to the atmosphere for centuries would not form them into a hard stone, because the water of crystalization, which is positively necessary to promote cohesion among their particles, is wanting. Water, then, is the great vehicle which chiefly imparts cohesive properties to common mortar.

Hard water, in freezing, parts with the mineral and earthy matters which it holds in solution, and the ice, when melted by heat, forms soft water; the action of freezing separates the pure water from the substances with which it was previously intimately united. The very same effect is produced by the action of freezing mortar in the walls of buildings; the mortar that is frozen in walls never afterwards acquires strong cohesive properties.

It is customary to suspend operations on buildings of brick and stone, during very severe frosts, when mortar freezes rapidly, but this is only because of the mechanical difficulties of applying the mortar before it freezes; the chemical science involved in the act of freezing its water being either unknown or ignored. Mortar should never be allowed to freeze in the walls of buildings; to allow it to do so, is unwise and unscientific.

Cold Days and Seasons.

A few years since we had a series of very mild winters, and the old people used to dwell upon the cold of by-gone days, and tell what changes had taken place in the temperature of the seasons. An opinion had become prevalent that our climate had really changed from very cold to moderately warm winters, and many theories were propounded to explain the cause of this. The opinion which seemed to gain general credence was, that the extermination of extensive forests, and the rendering of great tracts of wild land subservient to agriculture, was the cause of these climatic changes.

All these opinions have been overthrown by the severe cold of the last and the present winter, and the conclusion is forced upon us, that the operations of nature take place on such a grand and varied scale, that we cannot predict from the past, what kind of season—warm or cold—the next may be.

There had come down to us, by record and tradition, chilling accounts of a famous winter day, called the "Cold Friday," of January 19th, 1810. There never was such a cold day, and never could be a colder, according to traditionary sensations, but this famous old cold day, must yield the palm to the "Cold Friday," of January 23rd, 1857. In Portsmouth, N. H., on the Cold Friday of 1810, the thermometer stood at 12° below zero; on the Friday of the 23rd ult., it stood, in the same city, at 32° below zero—twenty degrees lower. Such is the testimony that has come down to us.

The reason why the Cold Friday of 1810 has become so famous for its cold, is owing to the suddenness of change in the weather: on the day previous the thermometer stood at 47° above zero, consequently the sudden depression of 59° of temperature tried the human system severely. Man can become inured to withstand a very low temperature without being chilled, if the cold remains steady; but sudden changes from warm to cold weather, and *vice versa*, try the human constitution severely. On the eastern Atlantic coasts of our country, the weather is very changeable in winter, persons should therefore be more careful of their health than in latitudes and districts where the weather is more constant.

It was attempted by several to explain the severe cold of last winter, by attributing it to electrical currents in the atmosphere, caused, as was suggested, by the great eruption of the volcano in the Sandwich Islands. Magnetism and electricity are very convenient terms to which changes in the weather may be attributed. It is a common practice, with many persons, to try and explain, learnedly, one incomprehensible phenomena, by another equally as little understood—and magnetism and electricity are terms which are too commonly employed in this manner.

Phosporus; its Source and Nature.

Phosphorus is but sparingly diffused as a component of minerals: it is to the animal kingdom that we turn for our supplies—to bones and the fluids of the body. These are our magazines of phosphorus, from which it is extracted in the large quantities now required for matches and the other manufactures into which it enters.

The leading characteristic of phosphorus is its extreme combustibility. Place a small fragment of it in an open tube, apply heat and ignite it—when, on impelling a current of air through the tube the phosphorus burns with great rapidity. The combustion having termitated, two different residues are produced, one a red-colored substance, the other white. The latter, or white, is an acid compound of phosphorus with oxygen. The former was long imagined to be a combination of phosphorus with oxygen also, but in a lesser ratio than necessary to constitute an acid. Whithin the last few years, however, M. Schrotter, of Vienna, demonstrated that the red compound in question was merely phosphorus. No combination has taken place to form this red compound, but the phosphorus has assumed a second, or allotropic condition, just as sulphur under the operation of heat does.

Common phosphorus has to be kept in water, for the purpose of guarding against spontaneous combustion; allotropic phosphorus, however, may be kept unchanged in atmospheric air; indeed, it may be wrapped up in paper, and carried in the pocket even, with impunity. Common phosphorus readily dissolves in the sulphuret of carbon, whereas allotropic phosphorus does not.

Phosphorus exists in all grains, and it forms a minute portion of every loaf of wheat bread that we eat. It exists in the human brain, but the greatest quantity of it is found combined with lime, in the bones of animals. The phosphate of lime sells at a high price, as a fertilizing agent, simply because it is a substance difficult to obtain in large quantities. Unlike sulphur and lime, which are obtained most abundantly from the mineral world, all our phosphorus is obtained from organic creations.

The Steamship Adriatic.

A correspondent signing himself "An American Engineer," in a communication to the New York *Daily Times* of the 30th, says in reference to the *Adriatic*:—

"When the *Adriatic* crosses the ocean with an expenditure of power produced by less fuel in proportion than any former ship, and continues to do it without costing more for repairs than other ships of equal power, she will have attained a degree of success which will be in proportion to her economy and endurance; but if she uses as much coal to a horse-power, and costs as much to repair as others, she will be a failure, in the true sense of that term as applied to the case of any last new steamer."

The idea conveyed in the above is, that our engineers consider that every new steamer must surpass its predecessor, must be an improvement on it, or they hold it to be a failure. This is the right true spirit of progress in engineering and every other art.

Weather on the Ocean.

It frequently occurs that of two vessels leaving England at the same time, and destined for the same port in the United States, one will experience very stormy weather, while the other will meet with moderate breezes and fine weather. This has occurred with vessels sailing in tracks not many miles apart, hence the great necessity for accurate tables of the prevalent winds of the ocean throughout all its parts, during every day of the year. The steamship *Arago*, which arrived at this port from Havre, France, on the 28th ult., in 13 days, (a very fast passage for her,) reported good weather, while every other steamer which crossed the Atlantic last month experienced most tempestuous weather.

Copper Coins.

As the old copper coins are about to give place to new small cents made of nickel and copper, an obituary of the "red cent" will not be uninteresting. It was first issued as a United States coin in 1792. It then bore the head of Washington on one side, and thirteen links on the other. The French Revolution soon after created a rage for French ideas in America, which put on the cent, instead of the head of Washington, the head of the Goddess of Liberty—a French Liberty, with neck thrust forward and flowing locks. The chain on the reverse was replaced by the olive wreath of peace. But the French Liberty was short-lived, and so was her portrait on our cent. The present staid, classic dame, with a fillet around her hair, came into fashion about thirty or forty years ago.

American Stoves in Europe.

James Napier, the engineer in Glasgow, Scotland, has presented to each of his twenty principal workmen an American cooking stove, with a full set of cooking utensils.—These stoves were cast at the celebrated Carron Works, Scotland, and are stated to be of very superior workmanship.

J. Redpath, Secretary of the North Eastern Railroad Co., Eng., who recently swindled the company out of nearly one million of dollars, has been tried, found guilty, and sentenced to transportation for life.

© 1857 SCIENTIFIC AMERICAN, INC.

Camel Locomotives.

In a communication to the President and Directors of the Baltimore and Ohio Railway Co., Ross Winans, of Baltimore, directs their attention to the superiority of a class of freight engines which have received the above rather droll name. All the freight business on this railroad has been performed by two kinds of locomotives, one of which has six driving wheels and a four wheel truck, and is commonly called the *ten wheeled eugine*; the other has eight wheels—all driving wheels; these latter are the "Camel Engines," most of which, for that railroad, were built by Mr. Winans. These engines were first introduced in 1855; there are now 109 of them employed.

There are seventeen ten wheeled engines employed. The Camel Engines, notwithstanding they have one-third more propelling wheels, are less complicated, in their general plan and in their details of construction, and have a less number of joints, journals and working parts liable to wear, derangement and breakage than the ten-wheel engines. The lesser number of the working parts of the eight-wheel engine and its general simplicity of construction enables all the parts to be made more aubstantial and durable, than the parts of the ten-wheel engine, while the entire weight of the two kinds of engines is the same. Camel engines have been enabled to do a much greater quantity of work per year than the ten-wheel engines, and at very much less cost of repairs in proportion to the work done. The greater liability of the ten-wheel engines to derangement kept them in the shops more of the time for repairs and adjustment.

The loads of the Camel Engines have, in practice, been nearly double that of the ten-wheel engines.

Mr. Winans says, respecting the work performed with the Camel and the ten-wheeled engines:

"The one hundred and nine Camel Engines now on your Road, are running about two million of miles per year with freight trains, at a cost of repairs of about $170,000 per year.

Agreeable to the present experience, if the work which is now being done by the Camel Engines, was done by the ten-wheel engines, it would take double the number of engines and double the cost of repairs in proportion to the work done."

The weight of the engines is twenty-six tons, bearing entirely on eight propelling wheels and distributed almost exactly equal between them, which is three and a quartor tons on a wheel, this furnishes a very large practicable amount of adhesion together with due regard to the preservation of the road.

The weight on each driving wheel is less than is the case with most of the engines now in use, even those of very inferior power and efficiency.

The cylinders of these engines are nineteen inches in diameter and twenty-two inches stroke of piston, operating on driving wheels of forty-three inches diameter.

They use coal for fuel, have large rocking fire grates, and can generate more steam than is required for their work, and their builder, Mr. Winans, very naturally, considers them to be "the most efficient and reliable freight engine extant."

Object and effects of Irrigation.

The purpose of irrigation is not only *moistening*, as many farmers may think, but chiefly *manuring* by means of irrigation; dam up a little stream, and make a small ditch along the higher part of a piece of land, so as to cause the water to overflow; in the immediate vicinity of the ditch the grass will grow a great deal longer and faster than at some distance from the ditch, where the where the moistening part had been executed to the same degree as above, showing that the water had left its manure at the first contact, with the surface of the ground. In laying out the ditches for irrigation, make many ditches, instead of a single one. There is no loss even by the greatest number of ditches provided they are put in the right place. The distribution of water, and the different modes of arranging the land for irrigation and drainage, depend on the shape of the surface of the ground, &c., and require a very fine judgment, and at least some knowledge of levelling and surveying. The rain water has no manuring effect on the soil; but its great efficacy is its dissolving quality, by which it makes the manure fit for feeding the vegetables. The water of running streams, led on the land for irrigation, fulfills two important conditions, namely that of yielding manure, and that of dissolving the manure, and is therefore superior to rain water for irrigation. Some have contended that rain water contains a little ammonia, and that it therefore possesses fertilizing properties, but the most refined analysis has failed to prove this.

Extracting Gold from Quartz, and Dressing Cotton Warps.

The Australian papers report the discovery, by Count Dembinski, of a process by whlch quartz or silica is chemically dissolved, and all the gold, metallic oxyds, and metals contained in it precipitated. His method is as follows:—"One part of quartz, in small pieces, is, together with two and a half or three parts of carbonate of soda, brought to a red heat and melted. Silicate of soda is now formed, deliquescent in air, and soluble in water, the carbonic acid of the soda being given off by the re-action. This silicate of soda is dissolved in water, in wooden vessels, and thus left for a few hours, during which time the gold and all other foreign substances contained in the quartz are precipitated. After the precipitate has been formed, the solution of silicate of soda is, by means of a syphon, decanted into another wooden vessel in which, by the injection of carbonic acid, the soda is separated from the silicic acid, and regained as carbonate of soda. By decanting it again and evaporating the water, it is made fit for another dissolving process. He obtains the carbonic acid which is used for regenerating the soda, from the same fire which he makes use of in combining the quartz and soda. This he does by employing the well known centrifugal air-pump, and follows up in all particulars the method of Melsens in the decomposing of saccharate of lime. By injecting carbonic acid into the solution of silicate of soda he separates the silicic acid from the soda. This latter remains in water, the silicic acid has been precipitated in the form of a transparent, nebulous, jelly-like substance, which cannot be separated from water by filtration. He now decants the solution of carbonate of soda, which, by means of evaporation, he obtains again as dry carbonate of soda. As such it can be made use of in further operations."

[In this description no mention is made of employing the silica, when in a soft state, to any purposes in the arts, but it is capable of various uses. One question arises: can gold be as profitably extracted from quartz by this process as by grinding the quartz into powder and extracting the gold therefrom by mercury —the well-known amalgamating process?

Another question also arises: will the gold actually precipitate, as stated? If it will not, the process is worse than useless for the purpose claimed. It is a question, however, which any of our chemical friends in California can soon decide for themselves: we have only to direct their attention to it.

The uses of soluble silicates are becoming very varied. The December number of *Newton's London Magazine* contains the specification of a patent granted to J. Leigh, of Manchester, Eng., for employing it as sizing for cotton yarns, in factories, as a substitute for starch. The process which he describes for obtaining soluble silicate of potash or soda, and for bleaching it, we shall describe, because it answers a number of inquiries which have lately been made of us. A great deal of quartz contains some iron, which imparts to it a dirty muddy color, and it cannot be used for a dressing to white cotton yarn, and many other purposes, until this coloring matter is removed. Mr. Leigh takes equal parts of clean white sand and dry carbonate of potash; or soda ash containing at least 50 per cent. of alkali. These are fused together in a suitable furnace, then taken out, cooled ground fine, and dissolved by hot water in an iron vessel, thus obtaining soluble silicate or glass. The solution thus obtained is purified with a solution of hypo-chlorite of lime (common bleaching liquor); by adding as much of it as will destroy its brown color, the whole being well stirred while the hypo-chlorite is being poured in. A little sulphuric acid is now poured into the silicate solution to take up the excess of free alkali. When this is accomplished, the silicate solution is boiled down to the proper strength in a boiler, and kept in glass carboys for use. We hope some of our enterprizing manufacturers of cotton cloth will soon make experiments with this new *dressing* for cotton warps, and give us an account of the results.

The Human Hand, and Inventions.

In the published lecture delivered by Prof. Huntington, of Harvard College, before the Massachusetts Mechanics' Association, at their last Fair, held in Boston, there occur many sublime and noble passages. The following are some extracts from it:

"Brain and heart are separate centres of vital systems; co-ordinate economies of the corporeal estate; each an independent organism, with its apparatus and offices; each carrying on its cunning processes; each originating its own complex motions, and maintaining its self-included government; yet both co-operating in a concord of perfect beauty in the commonwealth of the body. The hand is their common agent—their steward, secretary, marshal, factor, finisher.

Yet, when we look at it mechanically, the hand seems hardly less the seat of an organic system in itself. That, also, is a centralized economy. It is the consummation of a complicated order. For the hand properly begins at the roots of life. It is articulated from the clavicle of the chest. It finds, at the scapula, the plexus of muscles and nerves which bind it back and fasten it vascularly to the brain. So it grows out of the midst of the man, and swings by the efficiency of his imperial will.

Every bone and fibre, from the shoulder-socket, is tributary to the hand. We come to the structure itself, with its frame work of twenty-nine bones, its hinges and pulleys, its grooves and cords, its levers and screws of unequal lengths, its telegraph and tubes, its solids and liquids, its cushions and painted coverings; we find it the marvellous medinm of man's physical commerce with the world.

Here, then, is the point of contact between our human organization and all the mechanisms of science and art. This is the material joint or shackle, where the forces of machinery and of man meet and interlock. The primal and archetypal tool is the human hand; for complexity, for flexibility, for adaptation, for strength, for endurance, for delicacy, for noiseless play, unrivalled and inimitible. It pulls, and grasps, and drags, and picks, and smoothes, and punches, and lifts, and presses, and rubs, and pushes, and wrenches, and tears, and tickles, and folds, and stitches, and buttons, and kneads, and delves, and scatters, and smites. Will any other tool do so much? Yet, with all this pre-eminence in the aggregate of its qualities, it is limited in respect of them, taken one by one. As necessities multiply, man wants more hands, and tougher, and stouter, and longer than the two that nature gave him. Mechanism is the effort of this want to supply itself. Mechanism is an extension of the human hand. It is the primitive tool carried out into new sets of links, wheels, cylinders, pivots. Every grist-mill, from that of King Mithridates, of Cappadocia, to that of Oliver Evans, of Delaware, the threshing machine, the power loom, Archimedes' cranes and Hoe's presses, are only inanimate accessions taken on to our natural constitution, to help out its deficiencies. Cotton cloth was once principally manufactured by the East-Indians. But to-day, a single hand in Lowell can spin as much cotton in one hour as three thousand Hindoo hands.*

The hand has a school, a discipline and a dignity of its own. It is reconciled with all the mastery that man's best wits can wield. Its skill, in any performance, shares the honors of the brain. The handler is all; the things handled are alike. The wise handler of a hammer, trowel, axe, is as good as he that handles pen, or pencil, or lancet. The pitiful boaster of a pedigree of blood or titles —an ancestry that drove equipages rather than business, swung a dice-box instead of a sledge, and wore clothes as their vocation —finds his level. The hand itself rises to th rank of a reformer. It republicanizes thee race. It directs toil by thought. It glorifies its muscles with the crowning mind.

The hands administer; the head legislates. The hands perform; the head organizes. The hands execute; but it is the head still that originates, or invents. The coming in of a new tide of intellectual life is always an epoch in the mechanic's profession; it exalts their whole estate, if they only welcome it, and raises them to a level with emperors. When Boulton, the engineer, partner of Watt' stood in the presence of George III., to open to him the mystery of the steam engine, and the king asked him, as he might a peddler, 'What do you sell, sir?' Boulton replied, 'What kings, sire, are all fond of—*power*.'"

The Influence of the Sun's Rays in Consumption.

We copy the following remarks from the Boston *Medical Journal*, in which they are credited to Dr. Coventry, as forming a portion of an address delivered before the Massachusetts State Medical Society.

There is one subject which requires a more extended notice than is usually received from our systematic writers. I refer to the influence of the sun's rays. Every physiologist knows how absolutely necessary they are to the growth of plants, and the etiolating effect their absence or withdrawal has upon the complexion. Is it unreasonable to suppose that they may have some influence in causing or preventing tuberculosis? It seems well established that tubercles may be produced in animals by confining them in close and dark apartments, on a meagre diet. Dr. Hall says that by this means he produced fatty degenerations in animals which he considers analogous to, if not identical with, tuberculosis. In the city where I reside, there was an office connected with a large mercantile establishment, so situated that the sun never shone upon it. It was in the rear of the building with a single window, and that so surrounded with buildings as to exclude the sun. The occupants of the office died one afier another, until the proprietors became alarmed, and had the office removed to another part of the building. One of the occupants I attended, when in the last stage of his disease. He entered the office a strong healthy man, with no hereditary tendency to the disease, and temperate and regular in all his habits; but in less than two years he was carried, like his predecessors, to the grave, a victim to consumption. In his case I was never able to discover any cause, unless it was occupying that fatal office, where he was book-keeper.

Diseases Incident to Occupations.

The London *Lancet* says that there are a quarter million of persons living in Great Br tain constantly under ground in the darkness of mines. The average age of Sheffield workmen is thirty-five years; the average of the dry grinders of needles very much under this figure. The chief diseases among tailors is fistula; among bakers, scrofula and skin diseases; the latter may prevent the flour insects and weevils from irritating the skin of their hands by rubbing them with oil. The most dangerous part of the painter's trade is "flatting"—white lead, turpentine, and close ly heated rooms generate cholic; the remedy is sulphuric acid, cleanliness, tubs of fresh water, and fresh air; and, as an antidote, the more frequent use of white zinc or zinc lead.

The Cambridge Telescope.

The object-glass of the telescope used at the Cambridge, Mass., Observatory is fifteen inches in diameter, and has twenty-two feet and six inches focal length. Some of the eye-pieces are six inches long, making the entire length twenty-three feet. The telescope has eigteen different power, ranging from 103 to 2000. The hour circle is eighteen inches in diameter, divided on silver, and reading by two verniers to four seconds of time. The declination circle is twenty-six inches In diameter, divided on silver, and reads but four verniers to four seconds of arc. The movable portion of the telescope and machinery is estimated to weigh about three tons. A sidereal motion is given to the telescope by clock-work regulated by centrifugal balls.

© 1857 SCIENTIFIC AMERICAN, INC.

W, H. L., of N. C.—In making the red oxyd of lead, it is freely exposed to the atmosphere and kept constantly agitated, mechanically, which is the cheapest method of forming the oxyd.

C. A. S., of Ill.—We cannot now give you the name of the person to whom you refer.

J G. Hock, of Newark, N. J., manufactures and sells a portable apparatus for generating gas from coal, he informs us, in answer to J. McG's. inquiries published in correspondence column No. 20.

H. N. H. B., of Cal.—We thank you for so fine a list of subscribers, and haveentered the names from No. 17, January 1. Your subscription will not expire till No. 17, Vol. 14, two years hence.

S. A. Y., of N. Y.—Your mode of securing corks upon horse shoes by means of screws is a very old device.

B. I. B., of Mass.—Your plan for casting traps for water closets in a metallic mould contains nothing patentable. There is no such thing as copyrighting inventions.

E. C., of Iowa.—The method you describe to correct local attraction in compasses on board of iron vessels is not new.

J. R. K., of Ga.—There is no simple mode, with which we are acquainted, whereby you can make candles from lard. The operations require considerable apparatus. The painting which you refer to is executed in the common method, and japanned afterwards.

T. E. K., of Ga.—Stone flagging is the best material you can use for sidewalks; brick next. A composition of pitch and tar well boiled, and containing a considerable quantity of sand, makes very good sidewalks.

J. M., of Wis.—You have a right to amend your specification so as not to interfere with the claims of the patent referred to by the Office, but should your patent issue as thus amended, the invention would be an infringement with cases cited by the Office and to the owners of the patents you would be liable for damages the same as if you had no patent.

E. R., of La.—We would advise you as we do all who think they have invented a Perpetual Motion. Get up a model and try it. If it will operate, we will find you a customer for it at any price you may name.

O. K. M., of ——. Your idea of constructing runners to place under boats to travel upon ice is not new. Small sail boats have been often fitted up with runners, and many a delightful, rapid excursion has been taken in them, using the ordinary sail as the mode of propulsion. Adapting steam for the power would not be patentable.

G. T., of Pa.—The price of Minifie's drawing book is three dollars. The postage would be about 50c. to your place. On receipt of $3 50 we will forward you a copy by mail.

M. G. C., of Pa.—The substituting of alcohol in place of water in the manufacture of ink to prevent it freezing, is about as patentable as the substitution of alcohol for water as a beverage. At any hardware store here may be found the enamelled kettles, concerning which you inquire.

A. Y., of Pa.—We cannot refer you to any work which contains the information you desire in reference to the strength of elliptical springs.

J. G. H., of Ind.—We never take pecuniary interest in patents or inventions, therefore must decline your proposition. Your sketch we received, but not being able to accede to your propositions, we thought it of little use to write you.

D. H. W., of Mass.—Your request of the 20th did not reach us in time to receive attention. The sooner you get the engraving before our readers the better. Send on your Letters Patent.

J. A. S., of Wis.—"Hughes American Miller" is the most recent work of the kind that has been published. It is for sale by H. C. Baird, of Philadelphia.

J. F. M., of Mass.—In answer to your inquiry we would state that the additional improvement patented by you is exclusively your property, but you cannot use it in connection with your original patent, only in territory belonging to you. You must necessarily get the consent of the proper owner of the territory you have sold.

J. M. C., of Pa.—In 1846 a patent was granted to Chas. Hinton, for tri-lateral rails—having three surfaces, which could be turned upwards alternately, as the others wear or become damaged. Since this patent was granted we have several times received sketches of the same device; you cannot, therefore, expect to get a patent for it.

H. D., of Medford.—We have never examined the Philadelphia Ice Boat, therefore cannot give such information as you want in regard to it.

A. J. D., of Cal.—If you write to J. Roebling, C E., at Trenton, N. J., manufacturer of iron wire—a great engineer—describing minutely what you want, and the use ou intend to make of the cables, he will be able to give you the information desired, and we do not know any other person who can.

W. W. R.. of O.—The Patent Office returns $20 on rejected applications, if the matter has not been before the Office for a second examination.

H. M. T., of Ky.—We do not know of any book that treats of making marble paper, and on marbling the edges of books.

E. S. H., of N. Y.—In Vol. 11, page 288, you will find an engraving of a machine for bending plow handles. Thos. Blanchard, of Boston, has a machine for bending timber. Address him. When correspondents expect answers by mail, they should not omit to enclose a postage stamp.

J. H. P., of Me.—A slight galvanic action would exist between your iron keel and copper sheathing in salt water, sufficient, probably, to create decomposition, unless you first covered your keel with some non-conducting substance,

A. S., Jr., o Pa.—There is no "self-acting lathe" in use which will turn such an endless variety of ferms as you enumerate. By self-acting we suppose you mean self-adjusting. A lathe performing all the offices you require would be a lathe worth owning. Blanchard's machine for turning irregular forms approaches the impossibility which you inquire for, nearer than any other we are acquainted with.

L. B. S., of Conn.—If you examine the oscillations of any long pendulum, (not connected with clock work,) you will find yet much that puzzles the heads of learned mathematicians.

D. M. W., of C. W.—We have never heard of a single steam plow being constructed or operated on our continent.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Jan. 31, 1857:—

G. P. G., of N. Y., $30, J. H. of Ky., $25; A. W., of Pa., $30; G. W. F., of Pa., $70; J. H. L., of Vt., $30; J. P. R., of Pa., $115; W. W. D., of N. Y., $30; C. T. P., of N. Y., $275; A. M., of Pa, $30; R. S. J., of Ct., $30; W. H. T., of Wis, $55; G. D., of Pa., $30; H. McM., of N. J., $32; P. D., of N. Y., $25; W. T. B. R., of Ill., $30; G. W. A. of N. Y., $30; P. O. R, of R. I., $25; W. T., Mass., $25; W. L., of N. Y., $35; A. F. S., of Pa., $25; E. P. Jr., of Ct., $30; D. M. C., of O., $32; L. H. A., of Ala, 30; J. H. G., of Mass., $30; L. and B., of Me., $30; A. S. L., of N. Y, $275; J. M., of O., $25; M. C. B., of N.H., $15; H, J. B. C., of N. C., $60; A. M. G., of N. H., $25; B. F. J. of Mass, $165; W. and T. S., of N. Y., $35; D. W., of N. J., $20.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 31, 1857:

J. H. L., of Vt.; J. H., of Ky.; P. D., of N. Y.; J. R., of England; E. K. & Bros., of Vt.; W. & T. S., of N.Y.; W. T., of Mass.; A. F. S., of Pa.; D. W., of N. J.; P. O. R., of R. I..; B. L. P., of R. I.; W. H. T, of Wis.; J. M., of O.; W. S., of Ga.; M. C. B., of N. H.; B. F. J, of Mass., 3 cases.

Important Items.

COMPLETE SETS OF VOLUME XII EXHAUSTED.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers except 1, 2, 6, 9, 10, 11, and 13, we can yet furnish, if new subscribers desire to commence back to the beginning of the volume; but unless they specially request to the contrary when making their remittance we shall commence their subscription from date of receipt of the order.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

IMPORTANT TO INVENTORS.

THE UNDERSIGNED having had ELEVEN years' practical experience in soliciting PATENTS in this and foreign countries, beg to give notice that they continue to offer their services to all who may desire to secure Patents at home or abroad.

Over *three thousand* Letters Patent have been issued, whose papers were prepared at this Office, and on an average *fifteen*, or *one-third* of all the Patents issued each week, are on cases which are prepared at our Agency.

An able corps of Engineers, Examiners, Draughtsmen, and Specification writers are in constant employment, which renders us able to prepare applications on the shortest notice, while the experience of a long practice, and facilities which few others possess, we are able to give the most correct counsels to inventors in regard to the patentability of inventions placed before us for examination.

Private consultations respecting the patentability of inventions are held free of charge, with inventors, at our office, from 9 A. M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country.

Circulars of information will be sent free of postage to any one wishing to learn the preliminary steps towards making an application.

In addition to the advantages which the long experience and great success of our firm in obtaining patents present to inventors, they are informed that all inventions patented through our establishment, are noticed, *at the proper time*, in the SCIENTIFIC AMERICAN. This paper is read by not less than 100,000 persons every week, and enjoys a very wide spread and substantial influence.

Most of the patents obtained by Americans in foreign countries are secured through us; while it is well known that a very large proportion of all the patents applied for in the U. S., go through our agency.

MUNN & CO.
American and Foreign Patent Attornies, Principal Office 128 Fulton street, New York.

MINERALS.—For Sale, a Cabinet of Minerals, selected by a European Professor of the Science in the Austrian Tyrol. It comprises some 1100 to 1200 specimens, and is adapted for a College or State Institution. It is pronounced by adepts to be the most valuable and complete cabinet in the United States. For further particulars address R. S., box 101, Greenpoint, L. I. 1*

MECHANICS' FAIR at Washington City.—The third exhibition of the Metropolitan Mechanics' Institute will open on Monday, 2d March. Contributions for exhibition are solicited from all parts of the Union. Circulars may be had at the office of the American Institute, and of the Superintendent, Chas. F. Stansbury, Esq. H. JANNEY, Financial Secretary. 21 2

CRAMELL CARRIAGE SPRINGS—The patent on J. W. Cramell's Buggy and Carriage Springs, patented January 6, 1857, is offered for sale. The invention is very valuable. Address H. G. STEVENS, Agent, Olivet, Mich.

J. R. STAFFORD'S FAMILY RECEIPT Book, contains 150 Family Receipts, many of which are new, and all of which are practical, besides much valuable information for mechanics and others. The above book will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, No. 16 State st., New York. 21 8*

24 HIGHLY FINISHED ANATOMICAL Engravings of the Human Body, illustrating the Brain, Throat, Bronchial Tubes, Lungs, Heart and Great Arteries—Veins—All of the Muscles and Joints, &c., &c. These engravings are upon a chart, 22 by 30 inches, which is attached to and makes a part of J. R. Stafford's Family Receipt Book. The book and chart will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, No. 16 State st., New York. 21 8*

INVENTIONS, DISCOVERIES AND INFORMATION which, in the opinion of the London Society of Arts, are now required by the public. This list which contains 47 subjects, embraces wants in many of the Mechanic Arts. The list and explanation occupies a portion of three pages of J. R. Stafford's Family Receipt Book, which book will be sent free of postage on receipt of Ten cents or stamps, by J. R. STAFFORD, Practical Chemist, 16 State st., New York. 21 8*

1000 YOUNG MEN of small means can make over 100 per cent at home or abroad. Profits certain; no chance. Business new, easy, useful, honorable. Send stamp to M. J. COOK, Detroit, Mich.

INDELIBLE INK WANTED—JOHN EWEN, of Cincinnati, Ohio, wishes to obtain a recipe for making Indelible Printing Ink, to be used with type for marking clothing, and would pay liberally for it. 21 3*

FARMERS, PLANTERS, MECHANICS, READ—The Combination Patent Portable Upright Steam Saw Mill—simple, durable, efficient, and cheap. It commands the universal admiration of saw-mill men everywhere, and is being adopted in every part of this continent. The combination Patent Portable Shingle Mill—capable of sawing, planing, and jointing at the rate of ten thousand shingles in twelve hours. The shingles produced with this machine are as valuable in the market as the best shaved shingles. Ross's Patent Portable Grist Mill, which has received over sixty premiums, and is pronounced by the most experienced millers in this country and Europe to be the best mill ever constructed. It is cheaper than any other burr-stone mill. Woodworth's Planing Machine. Shapter's Portable Economic Engine. This power is more simple, more portable, more compact, more easily attended, and requires less fuel than any other machine. Send for pamphlet, which will give a full illustrated description of all our valuable patent machinery. J. M. EMERSON & CO.,
20 3 No. 1 Spruce st., New York.

SOUTHERN MACHINERY DEPOT—Number 98 Magazine st., New Orleans. Agencies and consignments of machines adapted to the Southern wants respectfully solicited. D. C. LOWBER. 20 7*

TRUSTEE'S SALE OF MACHINERY.—One 25 ft. Planer, two 12 ft. do., two 10 ft. do., three 9 ft. do., four 8 ft. do., five 6 ft. do. (new.) One 12 ft. Lathe, nine 8 ft. do., twelve 6 ft. do.; 6 Hand Lathes; 2 Gear Cutters, 3 Upright Drills, 1 Bolt Cutter, 1 Shaft Straightener, Planer, Centers, Chucks, &c. 4 sets 23 in. swing heads, counter shaft, and carriages; 4 sets 12 feet cross-heads; Planer and Lathe Patterns, and all kinds of small tools used in a machine shop. To be sold cheap for cash, said machinery is in good order. N. D. SPERRY, Trustee of the Estate of John Parshley.
New Haven, Conn., Jan. 2, 1857. 19 4

WOODWORTH'S PATENT PLANING, Tonguing, and Grooving Machines.—The subscriber, from his twenty-four years' experience both in the use and manufacture of these unrivalled machines, is prepared to furnish them of a quality superior to any that can be procured elsewhere for the same money. Prices from $85 to $1550. Also several good second-hand Planing Tonguing, and Grooving Machines for sale.
JOHN GIBSON,
19 12* Planing Mills, Albany, N. Y

TO ARCHITECTS—A premium of $250 will be paid for the best, and one of $100 for the second best plan, with specifications, for the college edifice for the New York State Agricultural College, to be built at Ovid, Seneca county, the coming season. There will be required a Culinary Department, in all its details, a Dining Hall and Laundry, to accommodate from 300 to 400, a Lecture Room, capable of seating 400 to 500, and accommodations for the steward and his family in the basement. In the first story will be required a President's Reception Room and an Office, five Professors' Rooms, five Recitation Rooms, a Library, and a Chemical Laboratory large and well lighted. The residue of the first and the three stories above, to be appropriated for Students' Rooms or Dormitories, not less than 175 in number, and not less than 16x10 feet in size, with a bed-room connected; the rooms lighted with one large window; halls not less than 10 feet in the clear, with stairways to approach them. Building to be four stories above the basement. Plans for heating, ventilating, and lighting in the most approved modern manner will be expected. The walls to be of stone or brick. If of stone, to be laid in courses rough hammered, corners suitably dressed, water tables, window caps and sills, cut; stone delivered on the spot for about $2 50 to $2 75 per cubic yard, mainly shaped for laying. Cut stone a higher price. A suitable front doorway of stone, with a cap of suitable depth to receive an appropriate design, with stone steps to reach it; all to be done in a plain, but neat and substantial manner, and with the strictest economy. Cost to be estimated. Plans and specifications to be completed and sent to J. P. Johnson Esq., State Agricultural Rooms, Albany, N. Y., on or before the 10th of February next. The subscriber may be referred to, if desired, at Waterford, Saratoga county N. Y. S. CHEEVER, President.
December 22d, 1856. 18 5

CRIDGE & WADSWORTH'S IMPROVED Oscillating Steam Engine. Patented December 12th, 1854. After a thorough practical test for about two years of the above improvement, our success warrants us in inviting the closest examination into its reputation in our own locality, and the great popularity of our engines in the midst of the most active and intelligent competition. To engine builders and capitalists we present the following considerations. An engine unsurpassed for durability, compactness, and simplicity, cutting off the steam close to each end of the cylinder, by means of a side pipe, adjustable by set screws, securing a perfectly steam-tight valve with little or no friction or pressure, combining all the advantages of a double slide valve engine, and at the same time dispensing with all cams, camrods, cross-heads, rock-shafts, slide-valves, etc., saving their cost of construction and necessary waste of power in running. And finally, we present an improvement (applicable to all cylinder engines) which enables the manufacturer to construct them at one half the cost of any other engine of the same value. This last consideration commends it to the immediate and earnest attention of all persons interested or engaged in manufacturing engines. Believing that the improvement is destined to revolutionize this branch of manufacture, we have decided upon selling such a number of shop rights as will introduce it into general use, and at the same time secure the persons purchasing against too much competition with each other, and on such terms as will bring it within the reach of all in moderate circumstances. Letters of inquiry in regard to terms, addressed to the undersigned, will meet with prompt attention. For explanations see No. 11, Vol. 12, SCI. AM. CRIDGE, WADSWORTH & CO., Pittsburg, Pa. 18 6

ENGRAVING ON WOOD and **MECHANICAL** DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, N. Y., Engraver to the Scientific American. 16tf

COMMERCIAL AGENTS, able and honest Men from N. England or N. York. A.W. Harrison, Phila. 16 13*

MACHINE BELTING, Steam Packing, Engine Hose.—The superiority of these articles manufactured of vulcanized rubber is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse, New York Belting and Packing Co., JOHN H. CHEEVER, Treasurer, No. 6 Dey street, N. Y. 22tf

A. & J. T. SPEERS' Central Depot for the sale of patent rights, patented articles, &c., No. 212 Broadway, New York. 22 2*

SWISS DRAWING INSTRUMENTS—A full stock of these celebrated instruments always on hand. Catalogues gratis. AMSLER & WIRZ,
20 14*eow 211 Chestnut st., Philadelphia.

BEE'S PATENT SAFETY ANNOUNCING Boiler Feeder—the only boiler feeder extant which contains a principle of safety—will pay its cost every month of use in economy of fuel, &c. Address BENJAMIN F. BEE & CO., North Sandwich, Mass. 145*eow

MACHINERY—S.C. HILLS, No. 12 Platt street, N Y., dealer in Steam Engines, Boilers, Planers, Lathes Chucks, Drills, Pumps; Mortising, Tenoning, and Sash Machines, Woodworth's and Daniel's Planers; Dick's Punches, Presses, and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c. 2 e3w

THE BEST PLANING, TONGUEING, AND GROOVING MACHINE IN THE WORLD.—Patented November, 21st, 1854, and November. 13th, 1855. These patents were obtained for improvements upon the celebrated Woodworth Planing Machine, the patent for which expired Dec. 26, 1856. By the combination of these several inventions a machine is produced of unrivalled excellence. A Gold Medal for this invention was awarded by the Mass. Char. Mech. Asso., at their Exhibition of 1856. Machines of all kinds and sizes, from $150 to $2000. All machines warranted to give entire satisfaction, and to be superior to any other machines now in use. For further information address the patentee. JAMES A. WOODBURY,
20 7* No. Scollay's Building, Court st., Boston, Mass.

PATENT RIGHTS sold on commission by S. C. HILLS, 12 Platt st., New York, who has for sale the following: Clark's Water Feed and Indicator; Crosby's Slitting Mill; Devlan, Wood & Hancock's Oil Saver; Creamer's Car Brake; Burnham's Suction and Force Pump: Van De Water's Water Wheel, &c. 20 tf

NOTICE—The subscriber is ready to contract for building steam saw mills, and warrant them to cut 2,000,000 feet of lumber in one year, with one up-and-down saw, and to make the dust and chips made by the saw make the steam to do it. Address, S. E. PARSONS, Wilkesbarre, Pa. 20 4*

WOODWORTH'S PATENT PLANING MAchines of every kind and all prices. A large assortment on hand; and I am prepared to construct any machine to order from ten days to two weeks, and guarantee each machine to be perfect in its construction, and give purchasers entire satisfaction. The patent has expired, and will not be renewed. I make this business exclusive, manufacturing nothing but the Woodworth Machines, and for that reason can make a better article for less money; and with my fifteen years' experience I fully guarantee each machine to come up to what I am willing to recommend, that is, that each machine shall be more than equal to any other manufactured for the same price. JOHN H. LESTER, 57 Pearl st., Brooklyn, N. Y., three blocks above Fulton Ferry. 20 tf

RECIPE FOR MAKING HONEY as good as that made by bees, and which does not cost over six cents per pound, sent for one dollar. N. R. GARDNER, Peace Dale, R. I. Any paper giving this advertisement three insertions, and sending a copy of it, will receive the recipe free. 18 5*

BARREL MACHINERY—CROZIER'S PATENT—This machinery was awarded a gold medal at the late Fair of the American Institute. One set of these machines, driven by 12-horse power, and with the assistance of 20 men make an average of 600 barrels per day of 10 hours, as our factory in Oswego, N. Y. A portion of the machinery may be seen at Messrs. Leonard & Wilson's, 60 Beaver st., New York, to whom reference may be made. For machines and rights address,
WELCH & CROZIER,
15 10* Oswego, N. Y.

WRIGHT'S PATENT SECTIONAL SPRING BED BOTTOM—The cheapest and most perfect article in use. LIPPINCOTT & CO., Manufacturers, No. 1180 Broadway, N. Y. 10 3m*

JAMES O. MORSE & CO., 79 John street, N. Y. (between William and Gold streets,) Manufacturers and Dealers in all descriptions of Pipes for Steam, Gas, and Water, together with every variety of fittings for the same; Steam Boilers and Boiler Flues, Stop Valves and Cocks, Steam Whistles, Oil Cups, Gauge Cocks, Governor Valves, Steam and Water Gauges, Steam, Power, and Hand Pumps, Steam Apparatus for warming buildings, Gas Apparatus for towns and factories. 17 13

RUNYAN & HOSTER, of Seneca Falls, Seneca County, N. Y., are now prepared to fill orders for any or all sizes of Lewis' Improved Direct Double-Acting Force Pump, the best pump in use. A full description of it may be found in the Scientific American of March 22d, 1856. Rights are also offered for sale by States or otherwise. R. & H. refer to J. T. Miller, Esq., P. M., Seneca Falls, N. Y. 13 12*

STOVE POLISH—The best article of the kind yet invented for family use. Sold wholesale and retail at 114 John st., New York, by QUARTERMAN & SON. 12 tf

30 HORSE STEAM ENGINE—At the Crystal Palace, called the "Endeavor," the best engine ever exhibited by the American Institute; will be sold low if applied for immediately. S. C. HILLS,
10tf 12 Platt street, N. Y.

WOODWORTH'S PATENT PLANING MAchines—Patent expires Dec. 27th, 1856. Machines constantly on hand, together with steam engines and boilers of all sizes. Lathes, planers, drills, circular saw mills, belting of leather and rubber of the best quality, Orders respectfully solicited at the Machinery Depot, 163 Greenwich st., N. Y. A. L. ACKERMAN. 21 8

FORBES & BOND, Artists, 89 Nassau st, N.Y., Mechanical and general Draughtsmen on wood, stone, &c

LAP-WELDED IRON BOILER TUBES.—Prosser's Patent.—Every article necessary to drill the tube-plates, and set the tubes in the best manner.
18 tf THOS. PROSSER & SON, 28 Platt st., N. Y

50 STEAM ENGINES—From 3 to 40-horse power also portable engines and boilers; they are first class engines, and will be sold cheap for cash. WM BURDON, 102 Front st., Brooklyn. 14 tf

GOLD QUARTZ MILLS of the most improved construction; will crush more quartz and do it finer than any machine now in use, and costs much less. WM BURDON, 102 Front st., Brooklyn. 14 tf

OIL! OIL! OIL!—For railroads, steamers, and for machinery and burning—Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the inventor and manufacturer.
F. S. PEASE, 61 Main st., Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 4 tf

NORCROSS ROTARY PLANING MACHINE.—The Supreme Court of the U. S., at the Term of 1853 and 1854, having decided that the patent granted to Nicholas G. Norcross, of date Feb, 12, 1850, for a Rotary Planing Machine for Planing Boards and Planks is not an infringement of the Woodworth Patent.
Rights to use the N. G. Norcross's patented machine can be purchased on application to N. G. NORCROSS,
Office for sale of rights at 27 State street, Boston, and Lowell, Mass, 45 6m*

NEW HAVEN MFG. CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters Chucks &c., on hand and finishing. These Tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address, "New Haven Manufacturing Co., New Haven, Conn. 14 tf

HARRISON'S 30 INCH GRAIN MILLS—Latest Patent.— A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn. 14 tf

BOILER INCRUSTATIONS PREVENTED—A simple and cheap condenser manufactured by Wm. Burdon, 102 Front st., Brooklyn, will take every particles of lime or salt out of the water, rendering it as pure as Croton, before entering the boiler. Persons in want of such machines will please state what the bore and stroke of the engines are, and what kind of water is to be used. 14 tf

© 1857 SCIENTIFIC AMERICAN, INC.

Science and Art.

Power of Sea Breakers.

From experiments which were made some time since, at the Bell Rock and Skerryvore lighthouses, on the coasts of Scotland, it was found that while the force of the breakers on the side of the German Ocean may be taken at about a tun and a half upon every square foot of surface exposed to them, the Atlantic breakers fall with double that weight, or three tons to the square foot; and thus a surface of only two square yards sustains a blow from a heavy Atlantic breaker equal to about 54 tuns. In November, 1824, a heavy gale blew, and blocks of limestone and granite, from two to five tuns in weight, were washed about like pebbles, at the Plymouth breakwater. About 300 tuns of such blocks were borne a distance of 200 feet, and up the inclined plane of the breakwater, carried over it, and scattered in various directions. A block of limestone, seven tuns in weight, was in one place washed a distance of 150 feet. Blocks of three tuns weight were torn away by a single blow of a breaker, and hurled over into the harbor; and one of nearly two tuns, strongly trenailed down upon a jetty, was torn away and tossed upwards by an overpowering breaker.

The Cedars of Lebanon.

The following is an extract from a letter of R. S. Calhoun, missionary, in the last number of the *Bibliotheca Sacra*:—

"The region of the Cedars—ten hours ride south-east from Tripoli—is not far from 7000 feet above the level of the sea, and is surrounded on the north, east, and south by a still higher range of mountains. It is open towards the west, and looks down upon a vast mass of rugged mountains, and beyond them to the 'great and wide sea.' The scenery is most majestic and impressive.

The soil in which the Cedars grow, is of a limestone quality, and so exceedingly rough and stony as to be entirely unfit for the plow. The whole region around is covered deep with snow, usually from early in December to the middle of April. But though the snow is so abundant the cold is not so intense as, for instance, in New England.

This region around the Cedars is too cold for rain, and hence almost the entire discharge from the clouds is in the form of snow, while at the same time, as far as I can judge, from the reports of the people inhabiting the nearest village, the ice is far less than with you, thus indicating a less degree of cold.

The Cedars are few in number. I have been counting them to be about four hundred. Our actual count was three hundred and ninety-three. Many of them are two feet, a less number three feet and even four and five feet in diameter. Several of them are from six to ten feet. One that I measured this morning is forty feet in circumference, say two feet above the ground. A little higher it sends forth five immense branches, each from three to five feet in diameter, which shoot up almost perpendicularly, thus, in reality, constituting five trees of great size. Many of the cedars are double, and a few even triple and quadruple; that is, from one root apparently there grow up two or more trees, united as one for a few feet, and then separated by a slight divergency, thus forming independent trunks, straight and beautiful.

As to the age of these trees, I do not know that history says much. In a chip two inches thick I have counted, to-day, sixty circles; which I believe you, who know better about such matters, would make equal to sixty years. A tree of six feet in diameter, according to this calculation, would be nearly 1100 years old. But as the chip alluded to indicates a very flourishing growth, and as the yearly increment becomes less as the tree increases in age and size, it is quite probable that a tree of six feet in diameter may be 2000 years old. At this rate, the giant tree mentioned above has probably breasted the empests of more than 4000 winters; thus making its origin nearly cotemporary with the flood. Travelers have been in the habit of cutting their names on these larger trees. One date I find as far back as 1673, at which time, as appears, the circumference of the tree must have been nearly as great as at present. From such data as these we must inevitably refer their origin to a remote antiquity."

The Sperm Whale.

Sperm whales belong to the polygamy class, and are not mated, or go in pairs, as is the case with the right whale. They are of a chocolate color, and when undisturbed, are found in large "schools," which are generally cow whales, protected on the outskirts, about two miles off, by two or three enormous male whales, called "old sogers." These sail in among the school alternately, at railroad speed, and sometimes meet with queer receptions from harpoons laying in wait for them. It is said that there are some of these old sogers which are a dread to all whalemen, and which are shunned on the least suspicion. The tunnage of a grown whale is enormous. When a carcass of one is disposed to sink, no cable of iron or rope has ever been known to sustain it. When harpooned, and not badly hurt, they settle down generally about one thousand fathoms before they move off or rise to the surface, hence all the lines of the boats are required for paying out. The head of a large sperm whale will weigh about 35 tuns and 45 barrels of pure spermaceti have been taken from his *case*, which is a mere vein in his head compared with the remaining part, which consists of four-fifths of the head, and is called "white horse"—a sinewy gristle, which is impenetrable to a sharp axe. Large copper bolts have been found embedded in the heads of some of them, caused by their attacks and destruction of vessels on the surface, or in plunging at wrecks on the bottom of the sea.

* * *.

BLEACHING AND DEODORIZING TALLOW, OILS, AND FATTY ACIDS.

Fig. 1

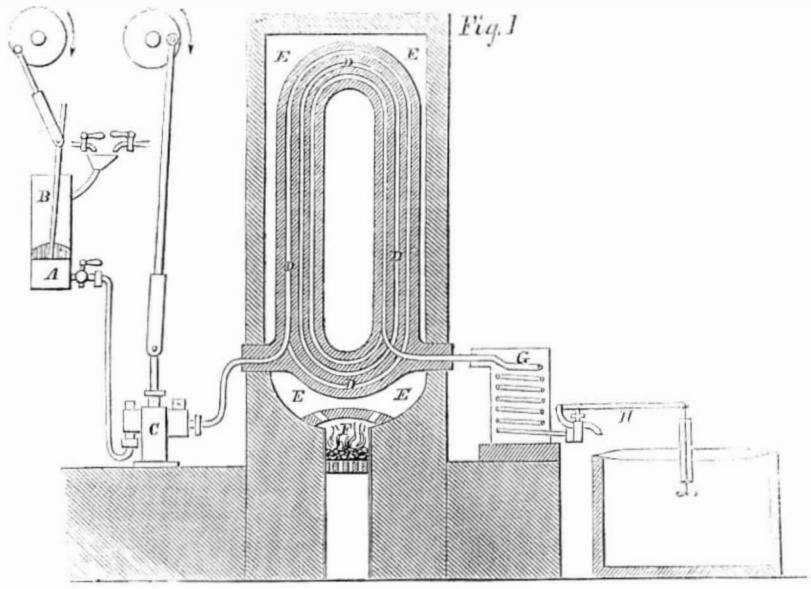
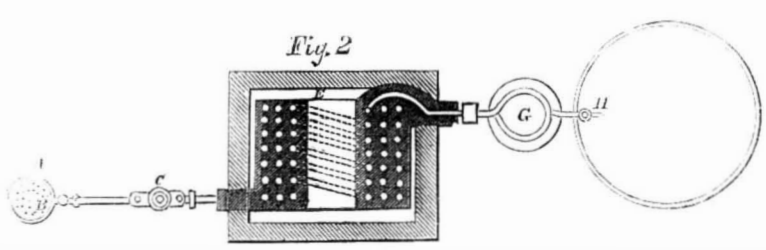


Fig. 2



The accompanying figures illustrate Tighlman's process for bleaching, deodorizing, and preparing tallow, fats and oils, for making candles.

Figure 1 is a vertical section, and fig 2 is a horrizontal section of the apparattus for carrying out the process.

A is the vessel in which the fat is macerated with half its bulk of hot water to make it in to an emulsion; this is acclerated by the disc shaped piston, B, perforated with numerous holes. and moved rapidly by machinery to churn it. C is a force pump connected to the vessel, A, and used to drive the liquid through the coil of piping, D D. The latter is made of iron; it is an inch in diameter externally, and only half an inch internally, and is heated by the fire, F. At the extremity of this pipe a worm, G, cooled by water and having a valve, H, fixed to the lower end is attached. The valve can be so loaded that the expansion of the materials in the tube, when it is heated to its working point, will not be sufficient to to lift it, provided the pump is not in motion. E E, is the flue for heating the pipe, D. By means of a thermometer, constructed of a number of substances, whose fusing points vary, the heat of the tube is measured and retained at the temperature best suited for the operation. Four holes half an inch in diameter, and three inches deep, are made in the iron jacket in which the pipe, D, is encased, and into one or other of these, tin, bismuth, lead, or nitrate of potassa is introduced. When the pipe becomes hot, the attendant dips a straight iron rod into these, and according as it sinks into the one or the other, he tells whether the heat is 440°, the melting point of the tin; 510°, the fusing point of bismuth; 612°, of the lead; or 660° Fahr., the degree at which saltpetre is liquefied.

During the working of this machine, care must be taken that the heated pipe is kept quite full of the mixed liquid by means of the pump. Under these conditions the fat is decomposed in ten minutes; and the temperature, according to the nature of the material, may range from the melting point of bismuth to that of lead, although a higher degree will not, in some instances, prove detrimental. A vertical position is given to the pipes, to prevent that tendency of the fat and water to separate, as it is necessary that both should be in intimate contact during the passage through the heating medium. The product discharged from the end of the worm, H, is a solution of glycerin in water and fatty acids, which are separated by subsidence in the receiving tank.

In various oils and tallows, there are two great constituents, glycerin and fatty acids, separated when exposed to certain degrees of heat and pressure, in the presence of water, in close vessels like the one represented. The melting heat of lead has been found to be a very good temperature to effect this object. The glycerin and fatty acids are separated from one another in vessel, H, by subsidence, the fat acid is then washed with water, and concentrated and purified. By distillation the fat acids may be further bleached and purified. A little carbonated alkali, such as soda ash, is mixed with the emulsion in the churn, A, and in order to prevent the action of an acetic acid, that may be generated on the pipes, D D. The stearic fat acid thus obtained, is made into those beautiful candles generally known by the name of *sperm*. Those which have a hard crystaline appearance are the best.

Size of American Lakes.

According to recent surveys of the five great Lakes of North America, it is found that they cover an area of 90,000 square miles. The total length of the five lakes is 1534 miles. Lake Superior, at its greatest length, is 355 miles; its greatest breadth is 160 miles; mean depth, 968 feet; elevation above the sea, 627 feet; area, 32,000 square miles. Lake Michigan is 360 miles long; its greatest breadth is 108 miles; its mean depth is 900 feet; elevation, 687 feet; area, 20,000 miles. Lake Huron, in its greatest length, is 200 miles; its greatest breadth is 160 miles; mean depth, 300 feet; elevation, 574 feet; area, 20,000 square miles. Lake Erie is 250 miles long; greatest breadth, 80 miles; mean depth, 200 feet; elevation, 555 feet; area, 6000 square miles. Lake Ontario has a length of 180 miles, and its mean breadth is 65 miles; mean depth, 500 feet; elevation above the ocean, 262 feet; area, 6000 square miles.

Yellow River.

In the province of Andalusia, in Spain, there is a river called the Tinto, from the hues of its water which are as yellow as topaz. If a stone happens to fall in and rest upon another, they become perfectly united and conglutinated. All the plants on its banks are withered by its waters whenever they overflow. No kind of verdure will come up where its waters reach, nor can any fish live in its stream. Its waters contain the oxyd of mercury and iron in solution, hence their destructive influence on fish and herbage.

There are now 500 American whaling vessels engaged in the Pacific Ocean, but the catch of whales appears to be decreasing every year.

MECHANICS

Inventors, and Manufacturers

TWELFTH YEAR!

PROSPECTUS OF THE

SCIENTIFIC AMERICAN.

This work differs materially from other publications being an ILLUSTRATED PERIODICAL, devoted chiefly to the promulgation of information relating to the various Mechanic and Chemic Arts, Industrial Manufactures, Agriculture, Patents, Inventions, Engineering, Millwork, and all interests which the light of PRACTICAL SCIENCE is calculated to advance.

The *SCIENTIFIC AMERICAN* is printed once a week, in convenient quarto form for binding, and presents an elegant typographical appearance. Every number contains *Eight Large Pages*, of reading, abundantly illustrated with *ORIGINAL ENGRAVINGS*—all them engraved expressly for this publication.

All the most valuable patented discoveries are delineated and described in its issues, so that, as respects inventions, it may be justly regarded as an ILLUSTRATED REPERTORY, where the inventor may learn what has been done before him, and where he may bring to the world a KNOWLEDGE of his own achievements.

REPORTS OF U. S. PATENTS granted are also published every week, including *Official Copies* of all the PATENT CLAIMS. These Claims are published in the SCIENTIFIC AMERICAN *in advance of all other papers.*

Mechanics, Inventors, Engineers, Chemists, Manufacturers, Agriculturists, and *People of every Profession in Life*, will find the *SCIENTIFIC AMERICAN* to be of great value in their respective callings.

Its counsels and suggestions will save them *Hundreds of Dollars* annually, besides affording them continual source of knowledge, the experience of which is beyond pecuniary estimate.

Much might be added in this Prospectus, to prove that the SCIENTIFIC AMERICAN is a publication which every Inventor, Mechanic, Artisan, and Engineer in the United States should patronize; but the publication is so thoroughly known throughout the country, that we refrain from occupying further space.

TERMS OF SUBSCRIPTION—$2 a year, or $1 for six months.

CLUB RATES.

Five Copies for Six Months,	$4
Five Copies for Twelve Months,	$8
Ten Copies for Six Months,	$8
Ten Copies for Twelve Months,	$15
Fifteen Copies for Twelve Months,	$22
Twenty Copies for Twelve Months,	$28

For all Clubs of 20 and over, the yearly subscription only $1·40.

Post-pay all letters, and direct

MUNN & CO.,
128 Fulton street, New York

© 1857 SCIENTIFIC AMERICAN, INC.